Metals Review
THE NEWS DIGEST MAGAZINE
Volume XXV - No. 10 ... 1952
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Type 202 Electrode Furnace, Temperature range 300-1750° F.

HOLDEN

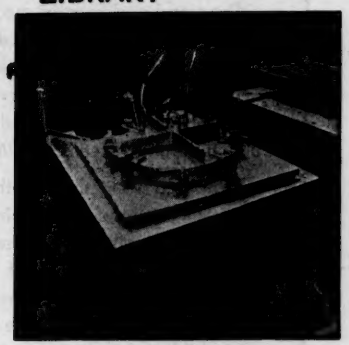
Furnaces

Salt Baths

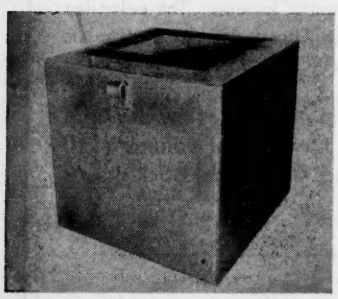
SALT BATH CONVEYORS for these applications:

Annealing	Neutral hardening
Silver brazing	Brass brazing
Copper brazing	Austempering
Martempering	Paint Stripping
Wire annealing	Wire Patenting
Descaling	Desanding
Isothermal annealing	Bright tempering

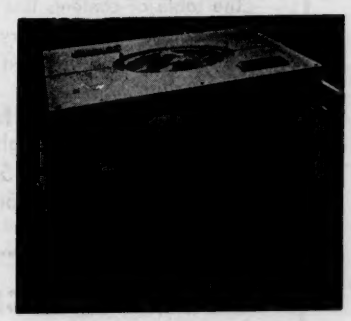
Liquid Carburizing
Aluminum heat treating
High Speed steel hardening
Cleaning of rubber molds



Liquid Nitriding Furnace.



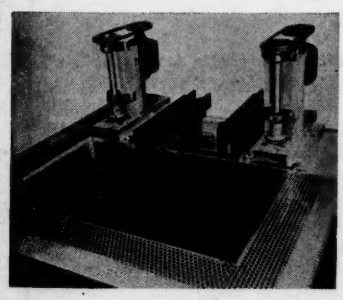
Prefabricated ceramic pot assembly, for use in over-the-side electrode furnaces with neutral baths.



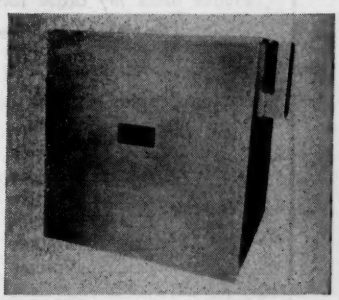
Gas Fired Type 212, Temperature range 300-1700° F.

TYPE 401 FURNACES

1. Pumps hot salt, with one pump, at a minimum rate of 100 gallons per minute.
2. Filters the sludges from the salt below the screened area in a trough approximately 8″ deep x 6″ wide in which filter screens are utilized.
3. Forced cooling for large production is accomplished by the use of an eight ounce blower which extracts hot air from the surface of the pot, and where necessary, a small jet of water is introduced at the entrance point of the cool air for added cooling speeds on large production applicants.



Type 401 Marquenching Austempering Furnace.



Furnace assembly of martempering-austempering unit, gas fired for small production application.

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VOLUME 8

REVIEW OF METAL LITERATURE

7728 abstracts; 884 pages; accompanied by subject index, author index, and publication index

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The yearly editions of the A.S.M. Review of Metal Literature are your reference key to all published information on metals and the metal industry. Volume 8 contains a complete survey of all the metallurgical literature published during the period January through December 1951.

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The table of contents lists the 19 subdivisions and classifications of the industry with explanatory notes on each. The classification is based on the ASM-SLA Metallurgical Literature Classification, perfected by a joint committee of the American Society for Metals and the Special Libraries Association. This logical and practical arrangement of the subject matter in the book is supplemented by a complete subject index liberally sprinkled with cross-references, for quickly and easily locating the information you need on any phase of metallurgy.

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Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXV, No. 10 **OCTOBER, 1952**

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A. S. M. Science Achievement Awards

The Committee of Judges of the NSTA-ASM Science Achievement Awards Program Shown Reading Student Entries. From left, they are: Ralph W. Watt, physics and general science teacher, Eastern High School, Washington, D. C.; Ralph Morgan, National Science Foundation; Russell Mebs, physical in metallurgist, National Bureau of Standards; and Jean McGregor, teacher of general and physical science, McKinley Technical High School, Washington. Standing are: John B. Chase, Jr., instructor in education, University of Virginia, and John D. Atkins, Jr., general science teacher Stratford Junior High School, Arlington, Va., chairman of the committee

Winners of the 1952 program of Science Achievement Awards for Students, sponsored by the American Society for Metals and conducted by the National Science Teachers Association, have been selected, and awards are now being distributed to the students in the different categories eligible to compete. (The categories and awards are listed on page 10 in the July issue of *Metals Review.*)

The award program, inaugurated in 1952, was designed to stimulate, encourage and recognize quality work in experimental science in students from the U. S. and Canada from the 7th through the 12th grades of school. The operating committee and its advisers were of the opinion that, if the long-range supply of scientists for research, engineering, teaching, and technician work is to be increased and the quality of preparation in science is to be stepped up, students on the junior high school level must be reached.

The 1953 program for the current school year is now being planned. It is time for all A.S.M. members to encourage junior and senior high school students of their acquaintance to begin work on projects and appropriate science activities for entry in the new contest. Official announcement posters describing the major aspects of the program will be distributed early this month.

The November issue of *Metals Review* will carry an illustrated account of one of the winning papers of the 1952 program.

Keith Johnson, chairman of the operating committee for the 1952 NSTA-ASM Awards program is supervisor of science in the Washington, D. C. public schools. J. B. Chase, Jr., instructor in education, University of Virginia, served as chairman of the committee of judges.

Twenty Years Ago

Quotes From Metals Review

June 1932

"H. J. French has accepted the invitation of the Board of Directors of the A.S.S.T. to deliver the Campbell Memorial Lecture at the annual meeting of the Society in 1933. Mr. French has charge of alloy steel and iron development at International Nickel Co. [now a vice-president] . . . The 1932 lecture will be presented by Edgar C. Bain, metallurgist, U. S. Steel Corp. Research Laboratories [now U. S. Steel vice-president]."

♦ ♦ ♦

September 1932

"More than 100 firms will exhibit in the 1932 National Metal Exposition which will open in the 174th Regiment Armory in Buffalo Oct. 3."

♦ ♦ ♦

On July 2, 1932, Dr. George Kimball Burgess, director of the United States Bureau of Standards and fourth president of the American Society for Steel Treating, died suddenly at the age of 58.

Transactions Paper on Electron Microscope Wins Howe Medal

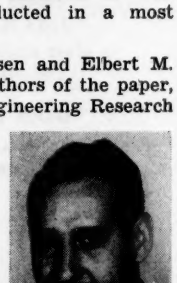
The paper "Carbide Precipitation in Type 304 Stainless—An Electron Microscope Study", by E. M. Mahla and N. A. Nielsen, of E. I. du Pont de Nemours & Co., has been chosen as the one having the highest merits of any published in the *Transactions* of the American Society for Metals in 1951. The selection was made by the unanimous decision of the Committee for the Selection of the Henry Marion Howe Medal Award for 1952. The award will be presented to Dr. Mahla and Mr. Nielsen during the annual banquet of the Society on Oct. 23 in Philadelphia.

N. A. Nielsen

Points on which the Committee based its decision were as follows:

Metallurgists will immediately recognize the unique application of the electron microscope, a comparatively new tool; method of preparing samples is good and the paper contributes to what has been recognized as one of the best sets of electron micrographs occurring in metallurgical literature; and the research is well planned and conducted in a most thorough manner.

Norman A. Nielsen and Elbert M. Mahla, the joint authors of the paper, are both in the Engineering Research Laboratory at du Pont.



E. M. Mahla

Mr. Nielsen graduated from Harvard University in 1942 with a B.S. degree in chemistry. Since that time he has been engaged in fundamental metallurgical research at du Pont. He is the author of papers on passivity and the corrosion behavior of stainless steels, and on electron microscopy, which have appeared in various technical journals.

Dr. Mahla received his Ph.D degree in metallurgy from Lehigh University in 1941. He is co-author of the textbook, Principles of Physical Metallurgy, and has written many papers on the welding of steel, titanium, passivity of stainless steels, corrosion, and carbides in stainless steels. He has been with du Pont since 1941.

India's new Met. Lab.

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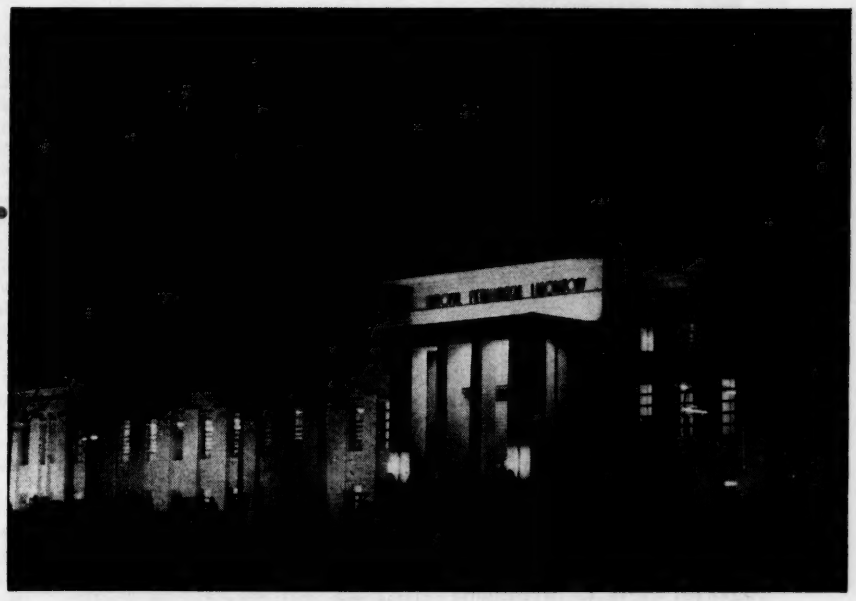
The five year old republic looks ahead...



THE National Metallurgical Laboratory of India, founded by the Council of Scientific and Industrial Research, and formally opened less than two years ago, has already accumulated a history of full-scale researches into all the various phases of metallurgy.

The Laboratory, in the steel town of Jamshedpur, India, covers all aspects of metallurgical research, with special concentration on ores, minerals, and refractories as applied to metallurgy. The preparation of minerals and ores and the smelting of the latter are so definitely a part of the country's metallurgical industries that facilities for mineral research are provided at the Laboratory. Research on refractories, and work on metallurgical furnace design have been underway since the laboratory opened.

According to G. P. Contractor, director, the Laboratory is meant to function as an up-to-date research center where knowledge of metallurgy, physics, chemistry, engineering and related subjects will be utilized to undertake both fundamental and applied metallurgical research. Provisions have been made in the Laboratory for administration, statistical studies, chemical analysis, metallography, physical chemistry, physics, the examination, preparation and smelting of metallic ores, the melting and heat treatment of metals and alloys, research into the structure and physical properties of metals and alloys, processing, mechanical working and testing of metallic products, electrodeposition, corrosion, and surface treatment of metals, and research on refractories. Facilities are also provided for applying research results to commercial operating conditions, and for the study of such conditions as they affect the quality of the products and efficiency and economy of commercial production.

The Laboratory is meant to function also as a clearing house for information, advising on the preparation of specifications for Indian conditions, and carrying out standard tests whereby the quality of manufactured products can be tested. Results of most of the research work carried out in the Laboratory are published in either the *Journal of Scientific and Industrial Research*, or in the proceedings and transactions of technical and learned societies and institutes.

The National Metallurgical Laboratory works in close collaboration with other research institutes and organizations of the Council of Scientific and Industrial Research, particularly on long-term research of a fundamental nature. To help and encourage industrialists in the solution of their problems, several industrial fellowships have been set up at the Laboratory.

The physical plant of the Laboratory has been so constructed as to allow for further enlargement and development of additional research laboratories.

An Advisory Board, consisting of industrialists, professors, technical officials from government departments, and others, has been constituted by the Council to help and advise the director of the Laboratory in connection with the program of research work to be carried out.

Named Manager at Armour Foundation

Maurice J. Day

A steel consultant to the nation's arms program, Maurice J. Day, metallurgical engineer at U. S. Steel Co., Pittsburgh, has recently been named manager of the materials and processes division at Armour Research Foundation of Illinois Institute of Technology. In this position he will direct research and development activities of 300 scientists and administrative personnel. The division includes chemistry and chemical engineering, ceramics and minerals, and metals research departments.

Dr. Day has been with U. S. Steel for 15 years, starting his career at the Gary, Ind., plant in 1937. From there he was transferred to the company's research laboratory in Kearny, N. J., in 1938, as a physical chemist. Three years later he became technical trade representative of the Chicago alloy unit, later serving as its manger. In 1947 he was transferred to Pittsburgh as a metallurgical engineer.

During World War II, Dr. Day held down the dual posts of consultant to Detroit industries using steel in ordnance work and consultant to the chief of ordnance in connection with the nation's steel helmet program. He is now a member of the Military Ordnance Department Metallurgical Advisory Committee for Large Guns, and the American Ordnance Association Committee for Small Arms and Ammunition.

Dr. Day is a national committee member and former chairman of the Chicago Chapter A.S.M.. He received his Ph. D. degree from Michigan State College in 1937.

Louisville Sponsors High-School Program

Reported by B. L. McMillan
International Harvester Co.

During the past year the Louisville Chapter A.S.M. conducted an educational program to interest high-school students in metallurgical engineering. The Chaper visited three of the Jefferson County high schools, and talked before approximately 300 pre-engineering juniors and seniors. At each school a short color film on steelmaking was shown, and the material covered in the A.S.M. pamphlet, "A Career in Metallurgy", was discussed. Interesting metallurgical gimmicks were used to keep the students attention, and the question periods which followed each session revealed the students' interest in the general subject.

On Engineering Day at the University of Louisville, "A Career in Metallurgy" was again distributed, and over 325 requests were made for the folder on that day alone.

St. Louis Offers Course on Metallurgy of Fabrications

The St. Louis Chapter A.S.M. is offering this year a series of six educational lectures on the Metallurgy of Fabrications. The first lecture, "Principles of Design in Fabrications", was given on Sept. 29 by John C. Georgian, professor of mechanical engineering at Washington University, the second, "Metallurgical Factors in Drawing and Forming of Metals", on Oct. 6 by E. F. Lundeen, assistant superintendent, quality control department, Inland Steel Co.

F. B. Foley, consulting metallurgist, International Nickel Co., will speak on "Metallurgical Factors of Castings and Forgings in Fabrications" on Oct. 13; V. V. Netch, vice-president, Hill Equipment Engineering Co., will present "Welding Fabrication and Metallurgical Considerations" on Oct. 27; and M. A. Scheil, director of the metallurgical research department, A. O. Smith Co., will wind up this series with a talk on the "Heat Treatment of Fabricated Structures" on Nov. 3.

The lectures are being held in the auditorium of the Union Electric Building, St. Louis. Registration fee was $2.50 to A.S.M. members, and $5 for nonmembers.

New Name Added to Quarter-Century Roster

Frank W. Faery of the Detroit Chapter has recently been awarded an honorary certificate commemorating 25 years of consecutive membership in A.S.M.

New *Review* Feature

With this issue, *Metals Review* will inaugurate a new monthly feature, "Meet Your Chapter Chairman", which will attempt to personalize the news magazine of the Society with photographs and short biographies of an informal nature of the chairmen of the various chapters of the Society. One or more of these biographies will be included in all forthcoming issues.

New Films

High Speed Tool and Die Steels

The Latrobe Steel Co., Latrobe, Pa., has announced the completion of a 16 mm. sound motion picture in full color entitled "The Story of High Speed Tool and Die Steels".

The film, which depicts the making of tool and die steels at Latrobe, is available for showing before qualified business and technical groups. Arrangements may be made with Latrobe district representatives, or by writing directly to Latrobe Steel Co., Latrobe, Pa.

Something More Than Steel

The Heppenstall Co., Pittsburgh, has completed a new color film entitled "Something More Than Steel". This 16-mm. sound movie shows the making of die blocks and shear knives, representative of the company's varied activities. Prints of the film may be obtained by writing directly to the Heppenstall Co., Hatfield St., Pittsburgh 1, Pa.

Steel With a Thousand Qualities

The Lebanon Steel Foundry, Lebanon, Pa., has released a new 37-minute, 1600-ft. full-sound, color film, Steel With a Thousand Qualities. It describes the production and inspection of steel castings and their many varied uses. A scientific educational film intended primarily for technical schools and societies, it will interest all persons, including design engineers and other users of steel and alloy steel castings, concerned with the techniques of specialized foundry operations. This film will be furnished without charge to those requesting it. Showings should be arranged through its distributor, Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20, N. Y., as far in advance as possible.

Metallurgical Courses Offered in New York Area

The New York and New Jersey Chapters of the American Society for Metals have prepared a list of the metallurgical education offerings in the New York Metropolitan area for 1952-53. Compiled by the educational committee of the New York Chapter, it is being distributed by the New York and New Jersey Chapters.

Included in the compilation are Brooklyn Polytechnic Institute, Columbia University, New York University, and Stevens Institute of Technology. Courses pertaining to metallurgy are listed with schedules and instructors noted. Degrees granted, fees per point, and graduate requirements are listed.

Meet Your Chapter Chairman

DETROIT

ROBERT F. THOMSON, head, metallurgy department, Research Laboratories Division, General Motors Corp., Detroit, a native of Ecorse, Mich. is a University of Michigan graduate. He received his B.S. degree in engineering in 1937, his M.S. degree in 1940, and his Ph.D. degree in 1941.

Mr. Thomson is married, no children. As a member of the Ecorse Board of Education, he spends his

spare time on committees to help promote the building of better schools and improving the educational standards in his community. He is a golfer —as often as his work and the weather permit.

He is a member of A.S.M.'s National Education Committee, and was on the executive committee of the Chicago Chapter from 1942-45, and has served on the executive committee of the Detroit Chapter from 1948 to the present. He was a director of the Detroit Chapter of the American Foundrymen's Society in 1948-49, and is on the advisory committee, University of Michigan, of the Foundry Education Foundation. He has also served on numerous committees of the Society of Automotive Engineers.

♦ ♦ ♦

LOS ANGELES

F. L. STAMM, vice-president, metals division, General Metals Corp., Los Angeles, was born in Chicago in November 1918. He traveled when young, attending many schools throughout the midwest and west, until he entered the University of California at Los Angeles where he stayed for four years.

Mr. Stamm is married and has two children, a boy, 6, and a girl, 5. His principal hobby is fishing—mostly for trout—throughout the western part of the country. When fishing is out of season, he spends his time repairing his tackle and tying flies, especially the varieties on which Eastern Brook and Rainbow trout feed. When he can't help himself, he says, his wife makes him work in the garden.

Mr. Stamm is a member of the local Jonathan Club, the American Society of Mechanical Engineers, the American Foundrymen's Association, and the American Ordnance Association.

After he left college, Mr. Stamm started working for General Metals and has been there ever since. He started in the shop as a toolmaker and worked his way through engineering, as chief engineer, works manager, and finally as vice-president in charge of the Los Angeles metals division of the company.

New Heat Treating Company

Theodore Doskus, superintendent of American Die & Tool Co., and Burns Stewart and James DeBlasse, of the heat treating department of the same company for the past 12 years, have formed the Reading Commercial Heat Treating Co., Reading, Pa., after the liquidation of the American Die & Tool Co. The new company will do heat treating work.

Explains X-Ray Diffraction and Its Uses

Shown Above at the Joint Meeting of Inland Empire Chapter A.S.M., the Inland Empire Chemists, and the Columbia Section of the A.I.M.E. Are, From Left: F. L. Howard A.S.M., Chairman of Inland Empire Chemists; S. A. Duran, A.S.M. Chapter Chairman; I. Fankuchen, Who Spoke on "X-Ray Diffraction and Its Applications"; and F. R. Morral, A.S.M., Chairman for the Meeting, Representing A.I.M.E.

Reported by F. R. Morral

Head, X-Ray Diffraction Dept.
Kaiser Aluminum & Chemical Corp.

From the improvement of nylons to the prevention of gall stones, I. Fankuchen, head of the division of applied physics of the Polytechnic Institute of Brooklyn, explained the importance of X-ray diffraction studies in scientific research and industrial development of today. Speaking to a joint meeting of members of local chapters of the American Society for Metals, the Inland Empire Chemists and the American Institute of Mining and Metallurgical Engineers in Spokane, Wash., August 5, he stated that X-ray diffraction was not being used to its fullest extent in the majority of its industrial and clinical applications.

Starting with the characteristics of X-rays, he pointed out that they are used for identification and analytical purposes. He estimates that this is 95% of their use in industry and university laboratories. He called attention to their possibilities in development work where they can be used in studying the preferred orientation of crystals, not only in metals but also in other substances such as rubber, rayon, nylon, and other modern fibers. In fact, some of these products have been improved as a result of X-ray diffraction studies. Another field in which they have been very useful has been in the study of organic compounds where they have helped in determining the molecular weights of sterols, proteins and viruses, and the arrangement of atoms in compounds like penicillin.

He pointed out how X-ray diffraction had contributed to biological and clinical studies and to solving problems of chemical reactions in the solid state.

He then described three fields in which he has been particularly interested in the last few years—small angle scattering, micro-camera techniques, and low-temperature techniques. Although most simple crystal structure determination of solids have already been made, Prof. Fankuchen commented, there are interesting crystal structure determinations to be made in the study of materials which are liquid at room temperature, but which solidify into crystals with proper low-temperature technique.

In the question period which followed, it was made clear that there is a similarity in the techniques which are used in these studies, since they applied not only to clinical problems, but also to fibers, minerals, and metals. Humorous incidents in the history of the development of X-rays, the determination of wave lengths, and of the study of crystal structures were related.

Comments from the audience indicated a desire to have the talk repeated in the future.

Bain to Receive Le Chatelier Medal

Edgar C. Bain, vice-president in charge of research for United States Steel Co., and past president of American Society for Metals, will be presented the Le Chatelier Medal, the Grand Medal of the French Society of Metallurgy, in Paris, in October during the Autumn Metallurgical Meeting, for his work and research in quenching of steels.

Few men have succeeded in accumulating a comparable array of

Edgar C. Bain

medals, awards, and lectureships in the metals field as has Dr. Bain. He was the 1949 A.S.M. Gold Medalist, he received the Society's Henry Marion Howe Memorial Medal in 1931 and the Edward deMille Campbell Lecture in 1932. In 1946 he received the Albert Sauveur Achievement Medal from the American Society for Medals, and a Distinguished Service Award in 1948 for meritorious contributions to progress in alloy steel.

Dr. Bain was born in Ohio, received his B.Sc. and M.Sc. degrees from Ohio State University, and was granted his Ph. D. degree in engineering by Lehigh University in 1936. He was associated with B. F. Goodrich Co., Akron, as a chemical engineer, at the close of the first world war, from 1918 to 1922 was a metallurgist with the National Lamp Co., and for the next two years a research metallurgist for Atlas Steel Co. In 1924 Dr. Bain became a staff member of the research laboratories, Union Carbide and Carbon Corp., where he remained until he joined Carnegie-Illinois in 1928.

The Le Chatelier medal was established in 1949, and alternately bears the likeness of Floris Osmond and Henry Le Chatelier, deans of French metallurgical science.

Acquires New Division

The Yale & Towne Manufacturing Co., New York, has recently acquired American Sintered Alloys, Inc., Bethel, Conn., which is to be operated as one of the powdered metal fabricating divisions of the company.

Washington Chapter Aids Civil Defense Program

Reported by J. H. Schaum

Metallurgist, Bureau of Standards

Forty-four members of the Washington Chapter A.S.M. have recently completed a survey of 44 buildings in the business district of the Nation's Capital, as part of an extensive program under the auspices of the District of Columbia Office of Civil Defense, to determine suitable locations for air raid shelters as a precaution against possible enemy action.

As a member of the District's Council of Engineering and Architectural Societies, the A.S.M. Chapter was assigned work in proportion to its membership. H. N. Arbuthnot, chapter vice-chairman, acted as chairman of this cooperative effort. The 44 members of the Society who were enlisted conducted the survey without personal remuneration.

Battelle To Build Special Purpose Lab

Battelle Memorial Institute, Columbus, Ohio, broke ground early in August for a new million-dollar "special purpose" laboratory building. Construction was authorized by the National Production Authority because of the important defense research being conducted at Battelle.

The new building will be of a specially reinforced-concrete construction designed to minimize vibration. This feature was incorporated into the design because plans call for the building to be occupied by research personnel working in electronics and other fields of research where delicate measurements are essential. The new building will provide 80,000 sq. ft. of work area in 187 unit laboratories.

ACP Expands Facilities

The American Chemical Paint Co. has announced the acquisition of an office and plant facilities on the West Coast and expects to be operating there about Nov. 1, 1952. The new plant is located at Niles, Calif., about 25 miles southeast of San Francisco. Present plans include the production of metalworking chemicals and agricultural chemicals.

Chapter Yearbooks

All local chapter secretaries of the American Society for Metals have on hand the yearbooks of most of the other chapters. A.S.M. members are at liberty to request the addresses of members and sustaining member companies from their chapter secretaries if the information is available.

THIRTY YEARS AGO

In May 1922 the 13 students constituting the first class of the evening metallurgy course at Temple University, organized and conducted by the Philadelphia Chapter, were graduated. The course was under the direction of JOHN J. CROWE, then metallurgist of the industrial division of the Philadelphia Navy Yard (now assistant vice-president, Air Reduction Co., Inc., New York). Present director is WALTER J. KINDERMAN, research engineer, Yarnall Waring Co., Philadelphia.

— 30 —

Northwest Chapter announced an educational course on steel treating under the chairmanship of OSCAR E. HARDER, professor of metallography at University of Minnesota (now assistant director of Battelle Memorial Institute, and an A.S.M. past president).

— 30 —

H. KENNETH BRIGGS of Minneapolis Electric Steel Castings Co. (now sales metallurgist, Miller & Co., Chicago, and one-time assistant secretary of A.S.M. in the national office), was chairman of the Northwest Chapter's Educational Committee.

Tin Saving Report Available From Navy

A report on "Methods of Saving Tin" prepared by Morris R. Machol as a consultant for the War Production Board during the last war has now been brought up to date and published in the *Journal* of the American Society of Naval Engineers for August 1952. Reprints of the article are available from the U. S. Navy to any individual or corporation with a legitimate interest.

Past Chairman Dies

George O'Neill, representative for the York County Gas Co., and the original chairman of York Chapter A.S.M., died on July 19.

Mr. O'Neill had been an extremely active member of the York Chapter since its inception, having served as chairman for its first and second terms, and had served on some committee every term since its founding, the last being the Membership Committee. He identified himself so very closely with the Society that he attracted many persons who were not members of York Chapter to pay visits to Chapter meetings.

In addition to his A.S.M. activities, Mr. O'Neill was identified with the York County Gas Co., industrial sales department, for many years. He took a special interest in introducing new salesmen in his territory to concerns established there.

AMERICAN SOCIETY FOR METALS

EXECUTIVE OFFICES - 7301 EUCLID AVE.

CLEVELAND 3, OHIO

CABLE ADDRESS: "ASM CLEVELAND"

COMMITTEE ON REFRACTORY MATERIALS AT HIGH TEMPERATURES

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(Committee Chairman)
Chief, Metallurgical Branch
National Advisory Comm. for Aeronautics
Cleveland Hopkins Airport
Cleveland 11, Ohio

RAY T. BAYLESS
(Committee Secretary)
Assistant Secretary
American Society for Metals
7301 Euclid Avenue
Cleveland 3, Ohio

G. M. AULT
National Advisory Comm. for Aeronautics Laboratory
Cleveland, Ohio

WM. L. BADGER
General Electric Co.
Gas Turbine Division
Lynn, Mass.

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Thompson Products, Inc.
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Euclid 17, Ohio

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Battelle Memorial Institute
Columbus 1, Ohio

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General Motors Corp.
Indianapolis, Ind.

J. J. HARWOOD
Office of Naval Research
Dept. of the Navy
2710 Bldg. T-3
Washington 25, D. C.

WILLSON HUNTER
National Advisory Comm. for Aeronautics
Cleveland 11, Ohio

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Dayton, Ohio

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Cleveland 11, Ohio

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Kennametal, Inc.
1 Lloyd Avenue
Latrobe, Pa.

HOWARD SCOTT
Westinghouse Electric Res. Labs.
East Pittsburgh, Pa.

L. F. YNTEMA
Fansteel Metallurgical Corp.
2200 Sheridan Road
N. Chicago, Illinois

CONFIDENTIAL SESSIONS

REFRACTORY MATERIALS FOR HIGH TEMPERATURES

You are cordially invited to make application to attend the two-day confidential conference on Refractory Materials for High Temperatures to be held under the auspices of the American Society for Metals at the Carter Hotel, Cleveland, Ohio, on

Monday, November 24, 1952
Tuesday, November 25, 1952

This meeting is held to provide an opportunity for the presentation and discussion of classified information that qualified engineers need to know in the performance of their jobs and in the best interests of national defense.

The preliminary program for this meeting is outlined on the next page. The variety of the subjects listed and the high qualifications of the speakers are assurance that the program will be an outstanding success.

This conference, while under the auspices of the ASM, is not limited to ASM members but to all individuals who can comply and who file in advance security qualifications.

Security regulations require that attendance at this meeting must be limited to citizens of the United States who possess evidence of current clearance through "confidential" by the Air Force, Navy, Research and Development Board, Atomic Energy or other credited United States Government agency.

To attend, the application form on p. 11 must be filled out and returned to the ASM headquarters in Cleveland through the military security officer having cognizance over the plant or activity and contract with which you are connected.

Once admission has been secured to the meeting room at the Carter, Security Authorities will require anyone leaving and re-entering to prove his clearance identity. Therefore, it has been arranged that luncheon will be served on Monday and Tuesday in the room adjoining the conference room. However, the meeting will be adjourned for dinner on Monday, between the afternoon and evening sessions. Luncheon will be served on Tuesday after the morning session and before the inspection trip at N.A.C.A.

ENROLLMENT FEE

Enrollment fee will be $10.00. This will include two luncheons and gratuities plus transportation to and from N.A.C.A. Laboratory and the Hotel Carter.

HOTEL RESERVATIONS

Those attending the conference are requested to make their hotel reservations direct with Miss Betty Maus, Reservation Manager, Hotel Carter, 1012 Prospect Avenue, Cleveland 15, Ohio, indicating the type of accommodations required and the date of arrival. The rates are as follows:

SINGLE					TWIN			
$4.00	$5.00	$6.50	$7.00	$7.50	$8.00	$9.00	$10.00	$11.00
DOUBLE					**SUITES**			
$6.00	$7.00	$8.50	$9.00	$9.50		$20.00	$30.00	

SEE PROGRAM NEXT PAGE

ASM Preliminary Program

REFRACTORY TYPE MATERIALS FOR HIGH TEMPERATURE APPLICATIONS

NOVEMBER 24 and 25, 1952

MORNING SESSION - NOVEMBER 24
(9:30 A.M. - 12:00 Noon)

Main Subject: *Molybdenum and Its Alloys*

Arc Cast Molybdenum and Molybdenum-Base Alloys—Their Manufacture, Fabrication and Properties—R. M. Parke, General Electric Co. (10 min.)

Sintered Molybdenum and Molybdenum-Base Alloys—Their Manufacture, Fabrication and Properties—By Howard Scott, Westinghouse Electric Co. (10 min.)

Related Discussion (5 min. each)

(a) L. F. YNTEMA, Fansteel Metallurgical Corp.
(b) H. HANICK, Wright Aeronautical Co.
(c) K. DIKE, NACA

Panel Session on Above Subjects* (30 Minutes)

The Elevated Temperature Properties of Molybdenum and Molybdenum-Base Alloys—By Howard Cross, Battelle Memorial Institute. (10 min.)

Protective Coatings for Molybdenum or Molybdenum-Base Alloys—By Ralph Wehrmann, Fansteel Met. Corp. (15 min.)

Related Discussion (5 min. each)

(a) K. M. BARTLETT, Thompson Products, Inc.
(b) D. G. MOORE, Bureau of Standards
(c) R. I. JAFFEE, Battelle Memorial—(Cladding)

Panel Session on Above Subjects* (30 Minutes)

— Recess 12:00 o'clock —

AFTERNOON SESSION - NOVEMBER 24
(1:30 - 5:00 P.M.)

Main Subject: *Ceramics and Intermetallics*

Ceramic Bodies for Use at Elevated Temperatures and Their Evaluations—By R. F. Geller, Bureau of Standards. (15 min.)

Related Discussion (5 min. each)

(a) F. K. DAVEY, Rutgers University
(b) G. M. BUTLER, Carborundum Co., or staff member
(c) TOM SHEVLIN, Ohio State University
(d) S. H. STUPAKOFF, Stupakoff Ceramic & Mfg. Co.
(e) N. P. THIELKE, Pennsylvania State College
(f) H. Z. SCHOFIELD, Battelle Memorial Institute

Panel Session on Above Subjects* (30 Minutes)

Intermetallics — New Type Refractory Alloys — By Louis Marchi or staff member, Armour Res. Foundation. (15 min.)

Molybdenum Disilicide, Properties at Elevated Temperatures —By W. Maxwell, NACA. (10 min.)

Titanium Disilicide, Properties at Elevated Temperatures—By R. Long, NACA. (10 min.)

Combinations of Carbides and Borides—Powder Ceramics—By Dr. Gordon Findley, Norton Co. (10 min.)

Related Discussion (5 min. each)

(a) R. SEELIG, American Electro Metals
(b) F. V. LENEL, R.P.I., Application of the Electrical Sintering Method to the Preparation of Ceramics and Intermetallics

Panel Session on Above Subjects* (30 Minutes)

EVENING SESSION - NOVEMBER 24
(8:00 to 10:00 P.M.)

Main Subject: *Uses and Application of Refractory Type Materials*

Problems Relating to the Usage of Refractory Materials in High Temperature Applications—By J. B. Johnson and/or R. Paris. WADC. (15 min.)

Turbine Operation with Refractory Type Materials—By G. C. Duetsch, NACA. (15 min.)

Related Discussion (5 min. each)

(a) W. R. SHERIDAN, Bell Aircraft (Rocket Nozzles)
(b) R. THIELEMANN, Pratt & Whitney Aircraft
(c) E. PEKAREK, Thompson Products
(d) S. MANSON, NACA, Thermal Shock

Panel Session on Above Subjects* (60 Minutes)

MORNING SESSION - NOVEMBER 25
(9:00 A.M. - 12:00 Noon)

Main Subject: *Ceramics and Intermetallics with Metal Additions*

Chairman: Dr. J. T. Norton, Massachusetts Institute of Technology

Theoretical Structure of Refractory Materials for Elevated Temperature Applications—By John T. Norton. (15 min.)

Additions of Metals or Alloys to Base Ceramic Type Materials —By Tom Shevlin, Ohio State University. (10 min.)

Infiltration of Intermetallic Type Bodies—By Claus G. Goetzel, Sintercast Corp. (10 min.)

Related Discussion (5 min. each)

(a) R. GURNICK, NACA
(b) J. R. TINKELPAUGH, N. Y. State College of Ceramics
(c) H. R. SPENDELOW, JR., Union Carbide and Carbon
(d) D. BENNETT, University of Illinois

Panel Session on Above Subjects* (30 Minutes)

New Developments on Titanium Carbide Compositions and Properties—By J. C. Redmond, Kennametal, Inc. (15 min.)

Elevated Temperature Properties of Zirconium Boride Alloys —By Frank W. Glaser, American Electro Metals (10 min.)

Alloys of Molybdenum Disilicide—By H. A. DeVincentis, NACA. (10 min.)

Related Discussion (5 min. each)

(a) R. WEHRMANN, Fansteel Metallurgical Corp.
(b) R. B. FISCHER, Battelle Memorial Institute
(c) W. L. HAVEKOTTE, Firth-Sterling Steel Co.
(d) J. J. HARWOOD, Office of Naval Research

Panel Session on Above Subjects* (25 Minutes)

Session Closes at 12:00 Noon

Lunch to 1:30

Tour and Inspection of NACA, Lewis Flight Propulsion Laboratory at 2:15 - 4:30 P.M.

Panel sessions will be made up of chairman as moderator and all speakers.

ATTEND TO THIS TODAY →

IMPORTANT: TO BE RETURNED TO ASM VIA MILITARY SECURITY OFFICER ONLY

Request for Clearance to Attend the

CONFIDENTIAL SESSION ON

"REFRACTORY-TYPE MATERIALS FOR HIGH-TEMPERATURE APPLICATIONS"

Sponsored by the American Society for Metals

MONDAY AND TUESDAY, NOVEMBER 24 and 25, 1952

HOTEL CARTER—RAINBOW ROOM

CLEVELAND, OHIO

American Society for Metals
7301 Euclid Avenue
Cleveland 3, Ohio

ATTENTION: Refractory Materials Committee

Gentlemen:

TO BE FILLED OUT BY APPLICANT

Clearance is requested to attend the above confidential session.

Applicant's Name (print)_____

Birthplace_____ Citizenship_____

If birthplace not U. S., give details_____

_____

Company Affiliation and Address_____

_____

Applicant's Title or Position_____

Applicant's Home Address_____

If you have already been cleared for access to CONFIDENTIAL or higher classification of information please specify

_____

(Air Force, Navy, Research and Development Board, Atomic Energy, etc.)

on_____ in connection with_____

(date) (project or contract number, etc.)

_____

This request is based upon my need to know the information and material to be discussed at this meeting as necessary in the performance of my work and in the best interest of the military or other government services.

DATE_____ APPLICANT'S SIGNATURE_____

TO BE FILLED OUT BY MILITARY SECURITY OFFICER

I hereby confirm clearance of this applicant as indicated above.

DATE_____ (SIGNED)_____

(Military Security Officer having cognizance over applicant's plant or activity and contract)

THIS FORM MUST BE RETURNED ON OR BEFORE NOVEMBER 15, 1952, VIA MILITARY SECURITY OFFICER (Navy, Air Force, Research and Development, Atomic Energy, etc.) HAVING COGNIZANCE OVER THE APPLICANT'S PLANT OR ACTIVITY AND CONTRACT.

Security Officer:—When request for clearance has been approved please mail direct to **American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio**

Headquarters Staff Members Feted

Completion of 25 Years on A.S.M. Headquarters Staff Was Celebrated by Marjorie R. Hyslop (Left) and Genevieve G. Fitzgerald (Right) on June 13 (Boss Eisenman in Center). The occasion was celebrated at a dinner for the staff old-timers at the home of Mr. and Mrs. Eisenman. Cakes built to the size and shape of Metal Progress *and* Transactions *and decorated to represent the front covers indicated their respective affiliations. Mrs. Hyslop started as secretary to E. E. Thum, editor of* Metal Progress, *and became successively managing editor and editor of* Metals Review *and managing editor of* Metal Progress. *Miss Fitzgerald has served as receptionist, secretary to J. Edward Donellan, former editor of Metals Handbook, and as secretary and assistant to Ray T. Bayless, editor of the* Transactions *and assistant secretary of the American Society for Metals*

N.Y.U. Offers M.S. Degree in Metallurgy

New York University is offering an M.S. degree in metallurgy for the first time beginning with the present academic year, according to a recent announcement by Thorndike Saville, dean of the College of Engineering. The curriculum, which will stress metals technology and physical metallurgy, includes courses in X-ray metallography, electron theory of metals, metallurgical laboratory techniques, and alloys for special temperature conditions.

This metallurgical program, under the direction of John P. Nielson, associate professor, and faculty advisor of the newly established student group of the New York Chapter A.S.M., enables New York University to offer the full complement of metallurgical curricula, from undergraduate work to the doctorate in engineering science with a major in metallurgy.

Demonstrates Low-Temperature Welding

Reported by G. M. Slaughter
Metallurgist
Oak Ridge National Laboratory

A lecture and demonstration on the "Techniques and Procedures of Low-Temperature Welding" was presented by Charles Brown before a joint meeting of the Oak Ridge Chapter A.S.M. and the local chapter of the Instrument Society of America on June 4.

Mr. Brown, divisional sales manager of the Eutectic Welding Alloys Corp., stressed the principles of surface alloying—that is, welding without melting the base metal.

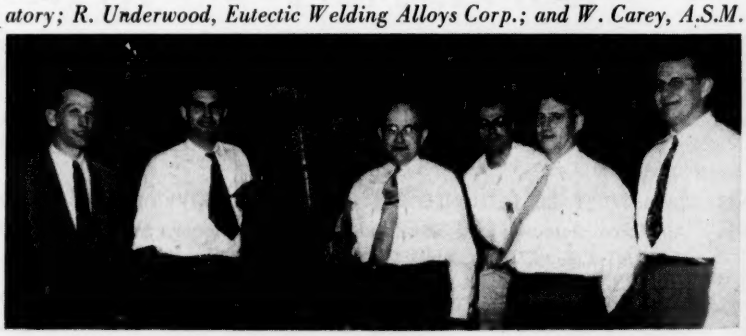
The use of filler metals which melt at temperatures below the melting point of the base metal, and which alloy readily with the base metal at this temperature, results, in many instances, in bonds at the interface of greater strength than that of the parent metal itself. Since alloying occurs primarily at the base metal surface, the chemical composition of this metal is not appreciably changed. Many of the available filler metals form a color match with the base metal so that it is extremely difficult to distinguish between them.

Other advantages associated with this process are brought about by the lower heat which is required. Distortion of the metal being joined is minimized. Tendencies toward carbide precipitation in stainless steels are lessened. The maximum operating temperature of the part after welding is not limited by the original melting temperature of the filler metal. The remelt temperature is generally higher.

The principle of alloying was exemplified by a demonstration. By the use of a suitable flux, an aluminum alloy filler rod was forced through a copper sheet intact by simply heating the copper while applying a slight pressure on the aluminum wire. An aluminum-copper alloy was formed whose melting point was lower than either of the two metals.

Mr. Brown showed several slides in which the use of a nonfusion welding technique on tool and die work was emphasized. The importance of repairing large expensive pieces of equipment by this process was also borne out in the slides.

At a Joint Meeting of the Oak Ridge Chapter A.S.M. and the Instrument Society of America, Charles Brown, Eutectic Welding Alloys Corp., Spoke on "Techniques and Procedures of Low-Temperature Welding". From left are: H. McKown, I.S.A.; S. Hluchan, I.S.A., Oak Ridge National Laboratory; Charles Brown; P. Patriarca, A.S.M., Oak Ridge National Laboratory; R. Underwood, Eutectic Welding Alloys Corp.; and W. Carey, A.S.M.



IMPORTANT MEETINGS
for November

Oct. 30-31—American Foundrymen's Society. Annual Metals Castings Conference. Purdue University, Lafayette, Ind. (C. T. Marek, Department of General Engineering, Purdue University, Lafayette, Ind.)

Nov. 5-7—Industrial Management Society. 16th Annual Time and Motion Study and Management Clinic. Sheraton Hotel, Chicago. (Lewis M. Glassner, Vice-President, I.M.S., 35 East Wacker Drive, Chicago 1, Ill.)

Nov. 6-7—10th Annual Pittsburgh Diffraction Conference. Mellon Institute, Pittsburgh, Pa. (E. E. Wicker, Publicity Chairman, Conference, U. S. Steel Co., 234 Atwood St., Pittsburgh 13, Pa.)

Nov. 10-11—Magnesium Association. Annual Meeting. Hotel Biltmore, New York City. (Martha I. Hansen, Assistant Secretary, M.A., 122 East 42nd St., New York 17, N. Y.)

Nov. 10-13—American Petroleum Institute. 32nd Annual Meeting. Conrad Hilton Hotel and Palmer House, Chicago. (Secretary, A.P.I., 50 West 50th St., New York 20, N. Y.)

Nov. 10-14—Wire Association. Annual Convention. Carter Hotel, Cleveland. (Richard E. Brown, Executive Secretary, W. A., 453 Main St., Stamford, Conn.)

Nov. 12-15—Society of Naval Architects and Marine Engineers. 60th Anniversary Meeting, Waldorf-Astoria Hotel, New York City. (W. N. Landers, Secretary, S.N.A.M.E., 29 West 39th St., New York 18, N. Y.)

Nov. 17-18—American Institute of Electrical Engineers. Technical Conference on Recording and Controlling Instruments. Benjamin Franklin Hotel, Philadelphia. (H. H. Henline, Secretary, A.I.E.E., 33 West 39th St., New York 18, N. Y.)

Nov. 20-21—National Association of Corrosion Engineers. Western Region Annual Corrosion Conference. Biltmore Hotel, Los Angeles. (A. B. Campbell, Executive Secretary, N.A.C.E., 919 Milam Bldg., Houston 2, Texas.)

Nov. 20-23—American Zinc Institute. Fall Meeting, Galvanizers Committee. Bismarck Hotel, Chicago. (F. V. Gent, Sec-Treas., A.Z.I., 60 East 42nd St., New York 17, N. Y.)

Nov. 30-Dec. 5—American Society of Mechanical Engineers. Annual Meeting. Statler Hotel, New York City. (C. E. Davies, Secretary, A.S.M.E., 29 West 39th St., New York 18, N. Y.)

Norton to Open New Plant

Norton Co.'s new grinding machine expansion is expected to be in full operation this fall or early winter in Worcester, Mass. This new 6½ acre plant will manufacture all types of Norton's surface, cylindrical, roll, toolroom, special grinders, and lapping machines, adding 50% to the company's present capacity.

Lincoln Announces Design Award Program

A new competition for designers, engineers and manufacturers of machinery of all types has been announced by the James F. Lincoln Arc Welding Foundation of Cleveland. The program offers $30,000 in 101 cash awards, as well as national recognition, for the best papers describing the mechanical design and construction of any type of machine or machine component which is designed for arc-welded steel fabrication. Any one who has designed planned or manufactured machinery can compete by describing his work.

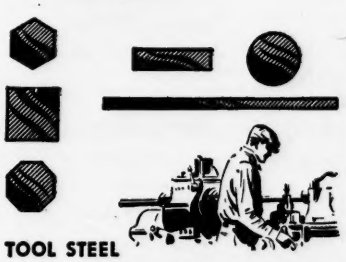
Papers will be judged by a jury of engineers, educators, designers, and fabricators selected from men prominent in industry and education. The program closes July 27, 1953. Rules are available from the Lincoln Foundation, Cleveland 17, Ohio.

Ten Years Ago
Quotes From Metals Review
August 1942

Commemorating the 50th anniversary of his association with the steel industry, friends of William P. Woodside, founder member and past president of the American Society for Metals, surprised him with a testimonial dinner in Detroit on July 2.

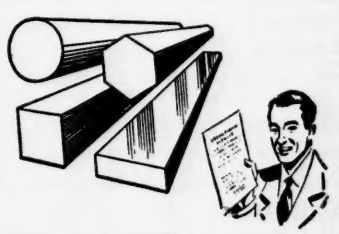
What special-purpose steel do you need?

Ryerson for Quick Shipment



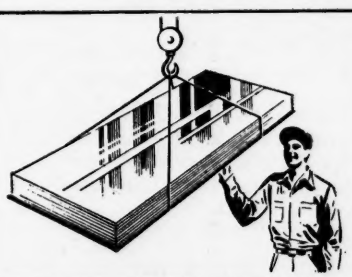
TOOL STEEL

Water, oil or air hardening tool steels. High in quality; economical in price. Hardening data with every shipment.



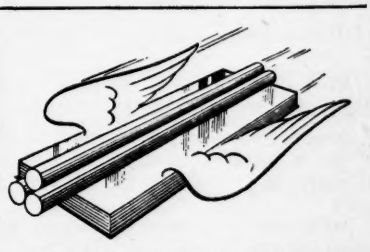
STANDARD ALLOYS

Rounds, flats, hex's, squares—hot rolled and cold finished—complete heat treatment guide with each shipment.



STRAIGHT CHROME STAINLESS

No allotment required for these stainless bars, plates and sheets. Can often replace restricted nickel-chrome types.



AIRCRAFT ALLOYS AND STAINLESS

Alloy bars, sheets and strip in more than 400 sizes, finishes, conditions. Stainless in more than 300, to meet all important aircraft specs.

OTHER PRODUCTS: GROUND FLAT STOCK, NITRALLOY, CARBON STEEL BARS, STRUCTURALS, PLATES, SHEETS, TUBING, ETC.

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Nov.	Mayflower Hotel	Victor Brown	Forging in General
Baltimore	Nov. 17	Engineers Club	B. R. Small	Heat Relief in Industry
Boston	Nov. 7	Hotel Shelton	W. R. Dornberger	Guided Missiles
Buffalo	Nov. 13	Sheraton Hotel		National Officers Night
Canton-Massillon	Nov. 4	Mergus Restaurant	S. G. Fletcher	
Chicago	Nov. 10	Furniture Club	R. L. Wilson	Trends in High Temperature Steels
Cincinnati	Nov. 13	Engineering Society Headquarters	Morris Cohen	Heat Treatment of Steel
Cleveland	Nov. 3	Hollenden Hotel	R. L. Wilson	Alloy Constructional Steels
Columbia Basin	Nov. 12	Desert Inn Rec. Hall	A. G. Zima	Ductile Cast Iron
Columbus	Nov. 12	Seneca Hotel	F. LeVeque	Corrosion-Joint Meeting With Columbus Technical Council
Dayton	Nov. 12	Engineers Club	M. E. Merchant	Machinability
Detroit	Nov. 10	Rackham Bldg.	H. J. Gomberg	Applications of Radioactive Materials
Eastern New York	Nov. 11	Bohemian Tavern	L. K. Poole	Stress Relief Annealing of Stainless Steels
Hartford	Nov. 11	The Hedges	E. V. Ivansoe, E. J. Campbell	Machinability
Indianapolis	Nov. 17		G. A. Roberts	Pre-Alloyed Steel Powder Metallurgy
Inland Empire	Nov. 11	Spokane Hotel	A. G. Zima	Modern Cast Iron
Kansas City	Nov. 19	Benish Restaurant	C. N. Kimball	
Lehigh Valley	Nov. 7	Hotel Traylor, Allentown	T. Y. Wilson	Continuous Casting
Los Alamos	Nov. 12		R. C. McMaster	Nondestructive Testing in Industry
Mahoning Valley	Nov. 11	Post Room, V. F. W.	T. F. McCormick	Extrusion of Aluminum and Its Alloys
Milwaukee	Nov. 18	City Club	Richard Herold	Castings of the Future
Minnesota	Nov. 20	Covered Wagon	B. R. Queneau	Stainless Steel Melting Practice
New Haven	Nov. 20	Yale & Towne Mfg. Co., Stamford		Plant Visit
New Jersey	Nov. 17	Essex House Hotel	Alex L. Field	Stainless Steels
New York	Nov. 17	Schwartz's Restaurant	R. L. Wilson	Constructional Steels
Northern Ontario	Nov. 19		C. Christofer	Slag to Metal Reactions
North Texas	Nov. 5	Dallas	E. J. Pavesic	Tool and Die Heat Treatment
Notre Dame	Nov. 12	Engineering Bldg.	W. R. Meyer	Preparation of Metal Surfaces for Plating, Painting or Finishing
Oak Ridge	Nov. 19	K. of C. Hall	A. P. Gagnebin	Ductile Cast Iron
Ontario	Nov. 7	Royal York Hotel, Toronto	I. A. DeCarie	Canada's Aluminum Industry
Oregon	Nov. 14	Congress Hotel	A. G. Zima	Modern Cast Iron
Ottawa Valley	Nov. 6	Physical Metallurgy Research Labs	A. T. Underwood	Testing and Application of Bearing Metals
Penn State	Nov. 11	State College	Samuel Epstein	Embrittlement of Ship Plate Steel
Pittsburgh	Nov. 13	Roosevelt Hotel	R. L. Wilson	Alloy Constructional Steel
Purdue	Nov. 18	Purdue Union	H. B. Knowlton	Selecting Material on Performance
Rhode Island	Nov. 5	Providence Eng. Society	Howard Taylor	Modern Metal Casting
Rochester	Nov. 10	Howard Johnsons	Carl G. Johnson	Powder Metallurgy, Production and Progress
Rockford	Nov. 19	Faust Hotel	D. A. Campbell	Gas Combustion
Rocky Mt., Pueblo	Nov. 20	Minnequa Club	J. E. Holtman	Modern Foundry Practice
Saginaw Valley	Nov. 11	Frankenmuth's	John J. Grebe	Industrial Atomic Power
St. Louis	Nov. 21	Forest Park Hotel	R. L. Wilson	Constructional Steels
Springfield	Nov. 17	Amherst, Mass.	B. L. Averbach	Fundamentals of Metal Structure
Syracuse	Nov. 5	Onondaga Hotel	G. H. Brumbach	Air Hardening Toolsteels
Texas	Nov. 4		E. J. Pavesic	Aspects of Tool and Die Heat Treatment
Tri-City	Nov. 4	Rock Island Arsenal	H. H. Harris	Modern Trends in Casting Techniques
Tulsa	Nov. 11	Mayo Hotel	F. N. Case	Salt Bath Heat Treating
Utah	Nov. 25	Salt Lake	A. G. Zima	Modern Cast Iron
Warren	Nov. 13	El Rio	G. M. Cover	Molybdenum as Used in the Steel Industry
Washington	Nov. 10	Naylor's Restaurant	H. L. Hovis	Metallurgy in the Watch Industry
Worcester	Nov. 12	Hickory House	H. J. Elmendorf	"Stump the Experts" Heat Treat Night
York	Nov. 12	Harrisburg	G. D. Dolch	High-Temperature Metals

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

W. W. Howell, Technical Abstracter

Assisted by Joseph Enke, Claudia Belknap, Ardeth Holmes and Members of the Translation Group

A GENERAL METALLURGICAL

301-A. Metallurgy. H. A. Holden. *Chemical & Process Engineering,* v. 33, Aug. 1952, p. 431-434.

Reviews recent developments in Ti, Zr, and other new metals; chromizing; cold extrusion, and nondestructive testing. 105 ref. (A general, L15, G5, S13, Ti, Zn)

302-A. Large Ingot Casting Speeds Heavy Press Program. *Light Metal Age,* v. 10, Aug. 1952, p. 17.

Development of 7000-lb. Al ingots by Kaiser Aluminum & Chemical Corp. will accelerate the Air Force's $389,000,000 heavy press program to mass-produce large aircraft parts. (A4, C5, Al)

303-A. South Korean Industrial Scrapbook. *Steel,* v. 131, Aug. 25, 1952, p. 74-75.

Some of the equipment and procedures of Korean metalworking plants, many of which are quite antiquated. (A4)

304-A. Is There a Real Structural Steel Shortage? *Architectural Forum,* v. 97, Aug. 1952, p. 112-115.

Questions and answers concerning supply and demand of structural steel, and basic economics involved. Graphs. (A4, CN)

305-A. Chemical and Metallurgical Problems Arising in the Development of Processes for the Release of Atomic Energy. J. P. Baxter. *Australasian Engineer,* July 7, 1952, p. 49-52.

Problems include supply and concentration of U, its extraction in high degree of purity, health hazards, and storage and disposal problems. (A general)

306-A. Alternative Materials. Murray C. Udy. *Battelle Technical Review,* v. 1, Aug. 1952, p. 84-88.

Various substitutes that may be used in place of certain strategic metals. Conserving Cu, alternatives for alloy steels, stainless steels, other conservation measures, plastics as alternative materials, and high-temperature materials. (A general)

307-A. Automatic Control Purifies Plating Wastes. *Canadian Metals,* v. 15, Aug. 1952, p. 18, 20.

Instrumentation for removal of soluble Cr products from plating wastes, at a plant which fabricates Cr-plated automotive parts. (A8, L17)

308-A. The Development and Present Status of the Magnesium Industry. A. W. Winston. *Engineer Research and Development Laboratories* (Ft. Belvoir, Va.), "The Magnesium Symposium", Feb. 9, 1951, p. 1-6.

Includes tables and graphs. (A4, Mg)

309-A. The Building of the Fairless Works. *Fortune,* v. 65, Sept. 1952, p. 90-94.

Picture story showing construction of U. S. Steel's Fairless Works, on the Delaware River near Morrisville, Pa. The furnaces and mills comprise an integrated operation from ore dock to finished sheet, tinplate, bar, and pipe. (A5, D general, ST)

310-A. U. S. 1975 Demand for Copper, New and Old, May Rise to 2,500,000 Tons, up 45% From 1950 Level. *Metals,* v. 23, Aug. 1952, p. 7-9.

Excerpts from President's Materials Policy Commission report dealing with the Cu position in this country. (A4, Cu)

311-A. New Research and Development Department: The Swinden Laboratories, Rotherham. *Metal Treatment and Drop Forging,* v. 19, Aug. 1952, p. 343-346, 354.

New facilities and the wide range of research conducted at these laboratories. (A9)

312-A. A Survey of the Antimony Situation. E. F. Jeal. *South African Mining and Engineering Journal,* v. 63, Aug. 2, 1952, p. 951, 953.

Statistical report including uses and availability of South African Sb, production and sales, market factors, and information concerning Consolidated Murchison, the leading South African producer. Tables. (A4, Sb)

313-A. Strategic Elements: Emphasis Is on Conservation. J. G. Terry. *Steel,* v. 131, Sept. 1, 1952, p. 82-84.

Conservation of Ni, Cu, and Cb by substituting less strategic metals and alloys. (A general, Ni, Cu, Cb)

314-A. Cobalt: World Sources and Supplies. J. B. Richardson. *Times Review of Industry,* v. 6, July 1952, p. 24-25, 27.

Includes description of methods of recovery from the ore, and of smelting and refining. (A4, B general, C21, Co)

315-A. What's Ahead in the West? *Western Metals,* v. 10, Aug. 1952, p. 49-51.

A brief economic survey of California's metalworking advances since Korean War. Future prospects. Tables. (A4)

316-A. (French.) **Purification of Cupola Fumes.** *Fonderie,* July 1952, p. 3027-3031.

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Principal static and dynamic types of equipment for the above. (A7, E10)

317-A. U. S. Mining Tomorrow. Demand for Minerals up 90% by 1975. *Engineering and Mining Journal,* v. 153, Sept. 1952, p. 90-93; disc., p. 93-95.

Brief indication of content of the five-volume Paley Report—of the President's Materials Policy Commission. Current consumption and projected demand are graphed for important metals. (A4, B12)

318-A. Separation of Cryolite From Carbon Dust From Aluminium Reduction Furnaces. P. I. A. Narayanan and G. P. Mathur. *Journal of Scientific & Industrial Research,* v. 11A, July 1952, p. 310-312.

Four methods of separation and results. Tables. (A8, C21, Al)

319-A. (Book.) **Economics of American Manufacturing.** Edward L. Allen. 566 pages. 1952. Henry Holt & Co., New York. $6.95.

Study of 19 industries in five general categories—basic metals, basic nonmetalics, metalworking, textile and leather, and consumers' goods. (A4)

320-A. (Book.) **General Report, Iron and Steel Committee.** 106 pages. 1952. International Labor Office, 1825 Jefferson Place, N.W., Washington 6, D. C. $1.50.

Committee report of the Fourth Session, Geneva, 1952, of the International Labor Office surveys the steel industry on an international basis. Includes reports on supply and demand, modernization and development, and labor conditions. (A4, Fe, ST)

321-A. (Book.) **Michigan Copper and Boston Dollars.** William B. Gates, Jr. 301 pages. 1951. Harvard University Press, Cambridge, Mass.

An economic history of the Michigan copper mining industry. Emphasizes use of economic tools in approaching this type of history. Statistics, notes, bibliography, glossary and index. (A4, Cu)

322-A. (Pamphlet.) **Nuclear Science in Engineering Education; a Selected List of References for Instructors.** *Office of Technical Services, U. S. Atomic Energy Commission,* TID-3011, Aug. 22, 1951, 14 pages. 10c.

Reports of the U. S. Atomic Energy Commission and its contractors, the journal literature, textbooks, and reference books. The references are listed by title under general papers, elementary nuclear science, reactor theory, reactor technology, reactor construction materials, power from nuclear reactors, heat transfer, chemistry, separation processes, radiation detection and protection; radiological hazards, radioactive waste and chemical processing, and textbooks and reference tools. Includes indicative abstracts. (A10, S19)

323-A. (Book.) **The Story of the Mushets.** Fred M. Osborn. 190 pages. Thom-

as Nelson & Sons, Ltd., Parkside Works, Edinburgh 9, Scotland.

The story of David and his son Robert Forester Mushet who did much to advance metallurgy. Both men were remarkable for a tremendous volume of work on ferrous metallurgy but the latter is famous for two major discoveries: use of spiegeleisen in steelmaking and development of the first steel to be self or air hardening. (A2, B22, ST, TS)

B

RAW MATERIALS AND ORE PREPARATION

308-B. Study in Flotation Frothing—Surface Tension: Air-Solution. S. A. Wrobel. *Bulletin of The Institution of Mining and Metallurgy,* Aug. 1952; *Transactions,* v. 61, 1951-1952, p. 505-517.

Apparatus and technique for determining surface tensions of frother solutions. Variation in surface tension of pine oil with time was measured and results are discussed. The term "air-bell carrying strength" as a specific characteristic of flotation frothers is introduced and defined. 11 ref. (B14)

309-B. Industrial Uses of Refractories, Part I. *Ceramics,* v. 4, July 1952, p. 213-220.

Emphasis on metallurgical uses, giving details of furnace design for blast furnaces, openhearths, bessemers, electric furnaces, hot-metal mixers, ladles and soaking pits. (B19, D general)

310-B. Electrostatic Concentration of Pyrochlore From Tororo, Uganda, British East Africa. *Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne,* Investigation 400, Aug. 30, 1951, 11 pages.

Magnetic and electrostatic tests on washed and demagnetized earth were conducted. The material consisted mostly of apatite, and usually contained traces of columbium mineral, pyrochlore, zircon, baddeleyite, tremolite, and a certain quantity of quartz. (B14, Cb, Ta)

311-B. Investigation of Churn Drill Sludges for Western Mining Corporation, Ltd. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines,* Report 509, Oct. 10, 1951, 6 pages.

Accurately sampling churn-drill sludges for gold assay is possible by tabling, amalgamating the concentrate, and assaying the various products. Tables. (B11, Au)

312-B. Treatment of Cobalt-Nickel Ore From Bogota, Canada, New Caledonia. *Comonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne,* Investigation 403, Oct. 23, 1951, 13 pages.

Treatment was attempted by a number of methods; flotation, tabling, and magnetic concentration were found to be ineffective. Several leaching methods were tried but only two were found to be promising. Tables and graphs. 14 ref. (B14, Co, Ni)

313-B. Concentration of a Tin Ore Containing Sulphides From the Ivy Mine, Emuford, Queensland. *Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne,* Investigation 405, Nov. 7, 1951, 7 pages.

Purpose was to determine whether sulfides in above ore can be satisfactorily separated from the Sn by flotation. Results show that 95% of them can be recovered for a loss of less than 10% of the Sn. (B14, Sn)

314-B. Concentration of Copper-Lead-Zinc Ore From No. 9 Mine, Drake, N. S. W. *Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne.* Investigation 406, Nov. 30, 1951, 16 pages.

Poor recovery of Au and Cu during flotation of above ore has been a problem for some time. Causes were investigated using mineragraphic examination and flotation tests with different reagents. Results are tabulated and summarized. (B14, Cu, Au, Zn)

315-B. How Gas Fuel is Speeding Rearmament. Henry M. Heyn. *Industrial Gas,* v. 31, Aug. 1952, p. 8-10, 24-26.

Major applications in metalworking include new jet pump for soaking pits; slab and billet heaters; annealing furnaces; carbon restoration; forging; aluminum production. (B18, F1, F22, J23)

316-B. New Fiber Filters, Insulates—Stands Up at 2300° F. *Iron Age,* v. 170, Aug. 21, 1952, p. 133-134.

"Fiberfrax", a new synthetic refractory fiber developed by Carborundum Co., is said to have a host of interesting possibilities in the metalworking field. (B19)

317-B. Studies in the Utilization of Non-Caking Indian Coal. Part V. Utilization of Briquettes Prepared From Tandur Coal in the Electric Smelting of Iron Ores. M. S. Iyengar. *Journal of Scientific & Industrial Research,* v. 11B, June 1952, p. 241-245.

Briquettes prepared from Tandur coal by application of the lime-tar reaction were subjected to low-temperature carbonization and their electrical conductivity and reactivity measured. Possibility of their use as reductants in electric smelting of iron ores. (B18, D5, Fe)

318-B. Refractories and American Productivity. *Refractories Journal,* July 1952, p. 308-311.

Observations on quality, application and performance of refractories, and some comparisons of British and American practice. (B19)

319-B. Crushing Practice and Theory. Part VIII. Crushing Rolls and Their Use. Brownell McGrew. *Rock Products,* v. 55, July 1952, p. 65-68, 102.

Resumption of a series of articles begun in June 1950 issue of *Rock Products* (last previous installment was June 1951). Feed size and roll diameter, the capacity formula, peripheral speeds, reduction ratio, power requirements, character of product, and applications. (To be continued.) (B13)

320-B. (French.) **Study of Slags of High Titanium Content.** W. Freundlich. *Bulletin de la Société Chimique de France,* May-June 1952, p. 655-663.

Composition, physical and chemical properties of Ti slag, particularly its reaction with H_2SO_4 and its X-ray structure. Tables, charts, and photographs. (B21, Ti)

321-B. (German.) **Internal Kinetics of Ball Mills. Impact Forces in Ball-Mill Grinding.** R. Liebold. *Technik,* v. 7, Mar. 1952, p. 113-118.

Mathematical method of computing above. Diagrams. (B13)

322-B. Size Reduction. Jullian C. Smith. *Chemical Engineering,* v. 59, Aug. 1952, p. 151-166.

Selection of crushing, grinding, and pulverizing equipment including jaw crushers, gyratory crushers, roll crushers, revolving mills, hammer mills, hogs, attrition mills, fluid-energy mills, and mills with multiple functions. Diagrams and graphs. (B13)

323-B. Flexibility in Zinc Milling. *Mining World,* v. 14, Sept. 1952, p. 57-60.

Peru Mining Co.'s Deming, N. M., flotation mill treats two types of Zn ore from company mines and custom shippers in two parallel circuits. Flowsheets and photographs. (B14, Zn)

324-B. Recovery of Precious Metals. *Times Review of Industry,* v. 6, Aug. 1952, p. 29-30.

Various methods for concentration of precious metals when found associated with base metals. Includes smelting and refining. Six flow sheets. (B general, C21, EG-c)

325-B. (German.) **Further Development of the Hammer Mill.** K. Jütte. *Brennstoff-Wärme-Kraft,* v. 4, Aug. 1952, p. 253-258.

Requirements the hammer mill must meet. Proposes simplification of construction. The problem of wear, sorting, regulation, and future possibilities of development. Charts, diagrams, and photographs. (B13)

326-B. (Russian.) **Refractometric Method for Investigating Melts.** B. V. Stark and Iu. M. Shashkov. *Doklady Akademii Nauk SSSR,* new ser., v. 85, July 1, 1952, p. 125-128.

Use of the refractometer for slag studies. Typical data are tabulated. (B21)

327-B. Corrosion of Refractory Materials. Part II. Helen Towers. *Blast Furnace and Steel Plant,* v. 40, Sept. 1952, p. 1054-1060. (Translated from *Berichte der Deutschen Keramischen Gesellschaft und des Vereins Deutscher Emailfachleute,* v. 29, 1952.)

Part II concludes a review of literature data. Includes refractories for blast furnaces, openhearth and converter furnaces, and glass tanks. 66 ref. (B19)

328-B. Fundamental Investigation of Steel Plant Refractories Problems: V. Arnulf Muan and E. F. Osborn. *Industrial Heating,* v. 19, Aug. 1952, p. 1492, 1494, 1496, 1498.

Deals with the system $2CaO \cdot SiO_2$-$CaO \cdot SiO_2$-$2CaO \cdot Al_2O_3 \cdot SiO_2$-FeO. (To be continued. (B19, D general, ST)

329-B. Deming Mill—a Materials Handling Problem Solved. Norman Weiss and H. W. Kaanta. *Mining Engineering,* v. 4, Sept. 1952, p. 857-862.

Equipment; layout; and metallurgical control and recoveries at American Smelting & Refining Co.'s new mill, Deming, N. M. Pb, Zn, and Ag are recovered. Photographs, flowsheet, diagrams, and tables. (B13, B14, Pb, Zn, Ag)

330-B. Crushing Practice and Theory. Part IX. Special Types of Roll Crushers. Brownell McGrew. *Rock Products,* v. 55, Aug. 1952, p. 164-165, 168, 188.

Diagrams and illustrations. (To be continued.) (B13)

331-B. (French.) **Thermal Insulation of Furnaces and Ovens.** (Concluded.) J. E. Lafon. *Métallurgie et la Construction Mécanique,* v. 84, July 1952, p. 517, 519.

Practical aspect of the problem, such as linings and examples of their application. Graphs and tables show temperature gradients through layers of various insulating materials. (B19)

332-B. (Book.) **Gold Metallurgy on the Witwatersrand.** A. King, editor. 447 pages. Transvaal Chamber of Mines (Hafner Publishing Co., New York) $12.50.

How gold ores are concentrated on the "Rand" told by 18 contributors. Profusely illustrated. (E general, Au)

C

NONFERROUS EXTRACTION AND REFINING

132-C. Progress in Titanium Research. The Search for Cheaper Production Methods. *Chemical Age,* v. 67, Aug. 2, 1952, p. 157-160.

Brief discussion, primarily on current work on Ti production, at England's National Physical Laboratory. (C general, Ti)

133-C. The Reduction of Nickel Oxide in a Fluidized Bed. Arnold Kivnick and A. Norman Hixson. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 394-400.

Experiments involving rate of reduction of finely divided solid nickel oxide with hydrogen. Results indicate that both a kinetic-reaction step and a diffusional, or mass-transfer step affect the over-all reaction rate. The process may find industrial use for preparing pure Ni from the oxide. The product at the end of one run was found to be 75% metallic Ni. 30 ref. (C2, Ni)

134-C. Republic Steel: New Titanium Producer. V. W. Whitmer and T. E. Perry. *Iron Age,* v. 170, Aug. 21, 1952, p. 117-122.

Republic Steel is now in commercial production of pure Ti and two Ti alloys. They are producing ingots both by arc and induction melting and are marketing the product as bars, strip, plate sheet, and forgings. Arc-melting furnace is diagrammed. Mechanical properties are charted and tabulated. Includes photomicrographs. (C21, Q general, M27, Ti)

135-C. (French.) Quantitative Study of the Reductive Melting of Ilmenite. William Freundlich. *Bulletin de la Société Chimique de France,* May-June, 1952, p. 490-501.

Factors to be considered when reducing ilmenite by melting in the presence of NaOH at elevated temperatures, separating Fe from Ti by forming a melt and slag at the liquid phase. The theoretical basis of such reduction, the role of carbon, the formation of slag, and practical interpretation of the results. Tables and graphs. 14 ref. (C4, Fe, Ti)

136-C. (French.) Söderberg Electrodes and Their Influence on the Construction of Electric Smelting Furnaces. *Journal du Four Electrique et des Industries Electrochimiques,* v. 61, Mar.-Apr. 1952, p. 39-44; May-June 1952, p. 72-77.

Various structural details of the electrodes. Their role in electric furnaces. Diagrams and photographs. (C21)

137-C. (French.) A New Process for the Production of Aluminum: The Loewenstein Process. D. Ménégoz and P. Belon. *Journal du Four Electrique et des Industries Electrochimiques,* v. 61, May-June 1952, p. 79-82.

New French electrolytic process which makes use of induction heating and vacuum volatilization. Its chemistry. Diagrams and illustrations. (C23, Al)

138-C. (German.) The Melting of Cuprous Oxide and its Mixtures With Other Oxides. E. J. Kohlmeyer. *Metall,* v. 6, Aug. 1952, p. 427-429.

A review on the basis of the literature. In particular, work done with copper oxides alone, with Cu_2O, CuO, and SiO_2, with Cu_2O in Ag_2O, mixtures and molecular compounds with PbO, ZnO, CaO, NiO, Ni_2O_3, Sb_2O_3, Ag_2O, etc. Results should be useful in recovery of Cu from its ores. 10 ref. (C21, Cu)

139-C. (German.) Present Developmental Tendencies in the Fire Refining of Copper. O. Nielsen. *Metall,* v. 6, Aug. 1952, p. 429-431.

Historical development leading to processes used at present, such as electric melting and desulfurization process for Cu developed by the author. (C21, Cu)

140-C. (German.) The Elimination of Oxygen, Sulfur, and Gases From Remelted Alloys by Means of Lithium. E. R. Thews. *Metall,* v. 6, Aug. 1952, p. 431-433.

Reviews previous methods for refining of remelted Cu alloys on the basis of the literature. Mechanism of the effect of Li additions. 25 ref. (C21, Cu, Li)

141-C. (German.) The Present State of the Electrometallurgy of Nonferrous Metals. Georg Eger. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, July 1952, p. 270-276.

The role of electrometallurgy in the production of Cu, noble metals, Pb, Zn, Sn, Mn, Cr, Ca, Ni, Co, Al, and Mg. Basic research. Power supply problems. Diagrams. (C28, EG-a)

142-C. (Italian.) Anodic Carbon Consumption During Industrial Electrolysis of Aluminum. R. Schadinger. *Alluminio,* v. 21, June 1952, p. 252-256.

Analyzes theoretical relationships among current efficiency, carbon consumption, and anodic gas consumption. Develops formulas for calculation of relationship between theoretical and actual carbon consumption in specific cases. An important fraction of the carbon is consumed by extraneous processes and not by the electrolysis itself. (C23, Al)

143-C. Now—Arc Furnace Zinc. *Chemical Engineering,* v. 59, Aug. 1952, p. 246-248.

Temperature is controlled well enough for smelting Zn in an electric arc furnace. Zn vapor quickly quenched, liquefied with novel condenser. Diagrams. (C21, Zn)

144-C. Moving in on Manganese. *Chemical Week,* v. 71, Sept. 13, 1952, p. 59-63.

Merits of two new processes for obtaining Mn from domestic ores. Includes cost analysis. (C21, B general, A4, Mn)

145-C. Monterrey Refinery Uses Continuous Lead Softening and Desilverizing Process. G. Ross and S. A. Peabody. *Journal of Metals,* v. 4, Sept. 1952, p. 915-918.

Method compared with Parkes process. Decopperizing, dezincing, and debismuthizing operations. Parting plant. (C21, C28, Pb, Ag, Zn, Bi)

146-C. Developments in Refractories for Smelting Non-Ferrous Ores. W. H. Dennis. *Mine & Quarry Engineering,* v. 18, Aug. 1952, p. 252-258; Sept. 1952, p. 283-285. (Conclusion)

Includes tabular data on physical and chemical properties of various types, also diagrams of some roasting, smelting, and refining equipment. (C21, EG-a)

147-C. (French.) The Preparation of Silicon-Titanium Alloys by Molten-Salt Electrolysis. Maurice Dodero. *Journal de Chimie Physique et de Physico-Chimie Biologique,* v. 49, June 1952, p. C11-C14; disc., p. C14.

Electrolysis of alkaline and alkaline-earth silicates with addition of TiO_2, electrolysis of potassium fluosilicate with additions of TiO_2, and production of Si-Ti alloys. Graphs. (C23, Si, Ti)

148-C. (Book.) Grundriss der Technischen Chemie. Teil III. Technische Elektrochemie und Metallurgie. (Outline of Technical Chemistry, Part III. Technical Electrochemistry and Metallurgy.) Carl Kröger. 167 pages. 1951. Vandenhoeck and Ruprecht, Göttingen, Germany. 12.80 DM.

Deals with technical electrochemistry in 58 pages and 29 diagrams, and with extraction metallurgy of ferrous and nonferrous metals in 104 pages and 130 diagrams. Includes electrolysis of fused salts; melting, alloying, and heat treatment; aqueous extraction metallurgy; slag reactions and oxidation; reduction processes; gas-solid equilibria. (C23, D8)

D

FERROUS REDUCTION AND REFINING

334-D. Tarred Ladle Nozzles Improve Ingot Pouring. *Iron Age,* v. 170, Aug. 21, 1952, p. 132.

Use by Steel and Tube Div., Timken Roller Bearing Co. (D9, ST)

335-D. Blast Furnace Charging. *Iron & Steel,* v. 25, July 1952, p. 309-312; Aug. 1952, p. 353-357.

Mechanization of the auxiliary equipment of two blast furnaces of the Park Gate Iron & Steel Co., Ltd., Rotherham, England. Illustrations include plan of blast-furnace equipment. (D1, ST)

336-D. Ore Reduction; Low-Shaft Smelting in India. R. A. MacGregor. *Iron & Steel,* v. 25, Aug. 1952, p. 375-376.

Special needs of India and the process involved in the Duffield smelter, which is still in stage of proving itself. Other unconventional iron-ore reduction processes. (D8, Fe)

337-D. Pig Casting Machine; New Method of Handling Ladles for Accurate Control. *Iron & Steel,* v. 25, Aug. 1952, p. 377.

British installation. (D9, Fe)

338-D. Symposium on Firing and Controlling Open Hearth Furnaces. W. H. Kahl. *Iron and Steel Engineering,* v. 29, 1952, p. 55-69.

Consists of brief papers: "Open Hearth Furnace Controls", George J. Gockstetter; "Fuel Oil Atomization With Natural Gas", W. A. Peters; "Control of Multi-Fuel Fired Open Hearth Furnaces", R. G. Bryan; "Fuel-Air Ratio Controls for the Steel Industry", L. H. Coleman; "Control Systems for Improved Open Hearth Operation", John R. Green; and "Modern Open Hearth Control", Harry Morton. Schematic diagrams. (D2, S16, ST)

339-D. Converts Melt Shop to All-Electric. *Steel,* v. 131, Aug. 25, 1952, p. 110.

Openhearth facilities in the melt shop of Timken Roller Bearing Co., are being replaced with top-charged electric furnaces. This move, which was prompted by the increasing need for high-quality electric steel, will replace three oil-fired 125-ton openhearths with three 80-ton basic electric arc furnaces. Layout diagram. (D5, ST)

340-D. Possibilities of Reducing Coke Consumption in the Production of Iron and Steel. Magnus Tigerschiöld. "Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources. Vol. III. Fuel and Energy Resources", 1951, p. 176-183; disc., p. 195-198.

Factors affecting consumption of coke in the blast-furnace process, especially beneficiation and sintering of iron ores. Brief survey of coke blast-furnace practice in Sweden. High-top-pressure furnace; use of oxygen-enriched air in the ordinary blast furnace and in the low-

shaft furnace; advantages and disadvantages of electric pig-iron furnace; and direct processes, especially the Hoganäs and the Wilberg sponge-iron methods and the Krupp-Renn process. 28 ref. (D1, D8, B16, Fe, ST)

341-D. Methods for Reducing the Amount and Quality of Coke Used in Smelting Iron Ore. P. E. Cavanaugh. "Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources. Vol. III. Fuel and Energy Resources", 1951, p. 183-195; disc., p. 195-198.

Study of suggested methods and comercially proven processes. Details to permit decision as to which iron-smelting process is worth detailed study in a country or region where construction of a blast furnace cannot be justified. Diagrams, tables, and map. 40 ref. (D1, Fe)

342-D. (French.) **Utilization of Coke-Oven Tar for the Heating of Openhearth Furnaces.** M. Hartemann. *Circulaire d'Informations Techniques,* v. 9, No. 7, 1952, p. 976-982.

Experience with four openhearth furnaces, heated with tar since 1948. Operations, properties of this fuel. Compares results with those obtained with other fuels, particularly in the desulfurization of steels. Data are tabulated. (D2, ST)

343-D. (French.) **Effects of Manganese in Steelmaking.** M. Bettembourg. *Circulaire d'Informations Techniques,* v. 9, No. 7, 1952, p. 983-990.

The relationship between Mn and its oxides and sulfides. Practical aspect of the effect of Mn on forgeability and purity of steel. (D general, ST)

344-D. (French.) **Kinetics of Carbon Elimination From the Steel Bath.** L. A. Schwarzmann, A. M. Samarine, and M. I. Temkine. *Circulaire d'Informations Techniques,* v. 9, No. 8, 1952, p. 1005-1013. (Translated from *Zhurnal Fizicheskoi Khimii.)*

Previously abstracted from original. See item 2b-8, 1948. (D2, ST)

345-D. (French.) **Kinetics of the Removal by Oxidation of Manganese, Silica, and Sulfur From Molten Iron.** A. M. Samarine and L. A. Schwarzmann. *Circulaire d'Informations Techniques,* v. 9, No. 8, 1952, p. 1015-1026. (Translated from *Zhurnal Fizicheskoi Khimii.)*

Previously abstracted from original. See item 2b-199, 1948. (D2, P12, Fe, ST)

346-D. (French.) **Converter Bottoms Made of Metallic Tubes.** André Richard. *Circulaire d'Informations Techniques,* v. 9, No. 8, 1952, p. 1124-1129.

Experiments leading to development. Construction of the bottoms and savings effected with them. (D3, ST)

347-D. (German.) **Flow Conditions in Hot-Blast Stoves on the Basis of Small-Scale Experiments.** Michael Hansen. *Archiv für das Eisenhüttenwesen,* v. 23, July-Aug. 1952, p. 245-252.

Investigations were done with the purpose of determining the convective transfer of heat in the dome in dependence upon shape, flow conditions in oval and round burner heads, as well as distribution of the heating gas in the various channels of the burner lattice. Construction details, charts, diagrams, and photographs. (D1, Fe)

348-D. (German.) **Recent Experiences With the Smelting of Iron Ores in the Low-Shaft Furnaces.** Erich Killing. *Stahl und Eisen,* v. 72, July 31, 1952, p. 925-928.

Features of the process. Low requirements of burden and fuels. Preparation of burden. Total flow of materials and heat balance compared with that of the blast furnace. Design of furnace and operation. Results of an experimental operation and economic efficiency of the process. Diagrams. (D8, Fe)

349-D. (German.) **Report on Work of the Hot Blast Stove Committee.** Werner Feldmann. *Stahl und Eisen,* v. 72, July 31, 1952, p. 928-933; disc., p. 933-934.

Heat-economy considerations in design of hot-blast stoves and heat-exchange conditions. Single and multiple-zone hot-blast stoves. Duties of the burner and its varied design. Arrangement and design of the combustion shaft. Adequate shape of the hood and its volume. Comparison of the different types of checkerwork. Insulation of hood and shaft walls. Proposals for comparable investigations. Directions for carrying through measurements on hot-blast stoves. (D1, Fe)

350-D. (German.) **Certain Intervals Before Transition in the Basic Bessemer Process.** Karl Georg Speity and Helmut Bücken. *Stahl und Eisen,* v. 72, July 31, 1952, p. 934-935.

Time measurement was inadequate, hence quantity measurement was required. Design of a chart for different quantities of pig iron and air blown per minute. (D3, ST)

351-D. The Effect of Emissivity and Flame Length on Heat Transfer in the Open-Hearth Furnace. M. W. Thring. *Journal of the Iron and Steel Institute,* v. 171, Aug. 1952, p. 381-392.

Recent developments in port design and aerodynamics of flames are taken into account in calculating optimum flame for the openhearth furnace, by postulating a simplified furnace and flame and calculating in detail the temperatures along the flame and the roof. Four types of flame are considered, each for three different fuel-input rates. The comparison indicates the optimum flames for three distinct phases of the openhearth process—charging, melting, and refining. Graphs and tables. 10 ref. (D2, ST)

352-D. Use of Oxygen in the Bessemer Converter. W. T. Rogers and L. T. Sanchez. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 933-938.

Results of a production experiment evaluating the effect of oxygen on blowing time, amount of steel scrap or cold pig iron which can be melted, and teeming temperatures of the molten steel. Graphs and tables. (D3, ST)

353-D. New Facilities Increase Openhearth Steel Production. *Metal Progress,* v. 62, Sept. 1952, p. 168, 170, 172. (Condensed from "A New Departure in Steel Production", Leo Reinartz Paper for Chicago Regional Meeting, American Iron and Steel Institute, Dec. 13, 1951.)

Openhearth furnace operations at the Middletown, Ohio, plants of the Armco Steel Corp. for the past 30 years. Engineering and operating features of new plant built in 1950. (D2, ST)

354-D. Manufacture of Steels for Low-Temperature Service. J. B. Austin. *National Bureau of Standards,* "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 36-44; disc., p. 45-47.

Manufacture of steels that have good notch toughness as indicated by transition from tough to brittle behavior in the Charpy keyhole notched-bar impact test. Influence of chemical composition, mode of deoxidation, heat treatment, and microstructure, including grain size. 16 ref. (D general, Q23, M27, ST)

355-D. Luminous Flame Increases Heat Transfer. *Steel,* v. 131, Sept. 1, 1952, p. 94, 97.

Full-scale furnace tests in Netherlands steel plant disclose that steam employed for atomizing fuel oil lowers peak radiation of flame and extends peak further from burner. (D2)

356-D. A Semi-Integrated Steel Producer Views the Steel Industry. William M. Akin. *Steel Equipment & Maintenance News,* v. 5, Aug. 1952, p. 10-12.

Economic status and future prospects. (D general, A4, ST)

357-D. Melt Carbon and Related Open Hearth Problems. Part II. W. J. Frisbie, Jr. *Blast Furnace and Steel Plant,* v. 40, Sept. 1952, p. 1046-1053.

Discussion, calculation examples, and numerous tables. (To be continued.) (D2, ST)

358-D. (German.) **The Problem of Refining Steel With Pure Oxygen.** Otwin Cuscoleca. *Stahl und Eisen,* v. 72, Aug. 14, 1952, p. 989-992.

The Austrian viewpoint. Statistical data for steel production in various countries. Tables and graphs. 10 ref. (D general, ST)

359-D. (German.) **Method of Operation and Metallurgical Principles of Steel Refining With Pure Oxygen Blown From the Top.** Herbert Trenkler. *Stahl und Eisen,* v. 72, Aug. 14, 1952, p. 992-997.

Compares practices at Donawitz and at Linz using a water-cooled copper tuyere. Results of 2, 5, and 15-ton trials. Comparative heat balance for a 15-ton melt of this type and a normal basic bessemer melt. Graphs. (D3, ST)

360-D. (German.) **Plants, Operation, and Economic Efficiency of Use of Oxygen in Steelmaking.** Kurt Rösner. *Stahl und Eisen,* v. 72, Aug. 14, 1952, p. 997-1004.

Fundamentals, plants, and equipment. Plan and sectional views of two Austrian plants using 25-ton converters. Details of oxygen-production plant. Economic and technical data. (D3, ST)

361-D. (Italian.) **Firing Openhearth Furnaces With Natural Gas.** T. Corea and C. Stocchi. *Metallurgia Italiana,* v. 44, July 1952, p. 259-266.

Various factors involved. Results of experimental runs on a 30-ton furnace, using natural gas only and oil supplemented with natural gas. (D2, ST)

362-D. (Portuguese.) **Graphic Representation of the Blast-Furnace Operation.** Janusz Wscieklica. *Boletim da Associacao Brasileira de Metais,* v. 8, Jan. 1952, p. 20-31.

A graphic solution of the principles of the blast-furnace process and of means for reducing coal consumption. (D1, Fe)

363-D. (Pamphlet.) **The Picture Story of Steel.** 56 pages. 1952. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

The making of iron; manufacture of steel; production of finished materials, especially by rolling and drawing; and uses of steel. (D general, F23, Fe, ST, SS)

364-D. (Book.) **The Structure and Properties of Mild Steel.** C. A. Edwards. 222 pages. J. Garnett Miller, Ltd., London. 20s.

Many factors influencing steelmaking: notably, effects of O_2 and other gases, and carbon. Also considers microstructures and constitution in relation to heat treatment with some notes on the influence of various elements on mild steel. (D general, M24, M27, J general, CN)

365-D. (Book.) **Was der Siemens-Martin Stahlwerker von seiner Arbeit wissen muss.** (What the Openhearth Crew Must Know About Their Work.) 152 pages. 1952. Stahleisen m.b.H., Dusseldorf, Germany. 8.50 DM.

An excellent guide covering every-

thing from the materials that enter the furnace to the care of regenerators—refractories, furnace details, gas producers, and all other auxiliary equipment such as ladles and stoppers, ingot molds, machines for grinding molds. Instructions for operating and maintaining each piece of equipment are very complete, from the sorting of the scrap to the teaming operation. Rules for safety. Elementary physics and chemistry of the process are described, but without mentioning these two words. Equipment for burning oil or tar is not described (little used in Germany).—W. Trinks. (D2, D9, ST)

E

FOUNDRY

520-E. Fluid Mechanics Applied to Founding. D. S. Richins and W. O. Wetmore. American Foundrymens Society "Symposium on Principles of Gating", 1951, p. 1-23; disc., p. 23-24.

Study of flow characteristics of molten Al in molding sands. Tests were designed and analyzed according to accepted fluid mechanics' principles. Determination made of various flow losses and effect of discontinuities which create riling and agitation in systems consisting of pouring basins, downsprues, horizontal runners, and some gates. Tables and photographs. 14 ref. (E22, Al)

521-E. Tentative Design of Horizontal Gating Systems for Light Alloys. L. W. Eastwood. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 25-30.

Based on a study at Battelle Memorial Institute under direction of Research Committee of the Aluminum and Magnesium Division, American Foundrymens Society. Supporting evidence and data were published earlier. Sketches and detailed drawing. (E22, Al, Mg)

522-E. Relation of Casting Quality to Gating Practice. W. H. Johnson, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 31-38; disc., p. 38-39.

Study of effects of gate design and associated metal flow conditions on casting quality. It was found that the type of gating for steel and gray iron is unimportant provided inflow velocities are not excessive. Drossing metals such as Al and Mn bronze require specialized gating procedure and the use of moderately choked systems is indicated. Numerous photographs. (E22, CI, Al, Cu)

523-E. Considerations in Feeding of Castings. A. K. Higgins. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 40-50; disc., p. 50.

A discussion to clarify factors that influence soundness and density of the cast shape, with particular reference to long freezing range alloys. Major variables involved; theory; types of freezing range; mechanisms of feeding; effect of demand rate; rate of flow; feed pressures; rate of solidification; and step feeders. Brief mention of Cu, Cu-Ni alloys, Sn bronze, and Al bronze. Photograph, graphs, and diagrams. (E23, Cu, Ni)

524-E. Gating Aluminum Castings. T. E. Kramer. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 51-56; disc., p. 56.

Foundry gating experiences in part based on ideas from the AFS film on "Principles of Gating." Photographs and diagrams. (E22, Al)

525-E. Application of Gating and Risering Studies to Production Castings. J. B. Caine. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 57-60.

Pitfalls in the practical application of laboratory results, principally to steel castings. Radiograph and table. 10 ref. (E22, CI)

526-E. Application and Value of Gating Principles Recomended by the A.F.S.-Battelle Film "Fluid Flow in Molds" to Steel Castings. J. H. Lowe and J. Austin. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 61-65; disc., p. 65.

Illustrated examples of principles and modifications, applied to production castings. Discussion of quality of results. Tables, chart, and diagram. (E22, CI)

527-E. Gating and Risering Tin Bronze Castings. Bernard N. Ames. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 66-74.

Successful practices at the New York Naval Shipyard. Effect of nucleation on dendrite growth and grain size, effect of cooling rate on grain size and shape, and on mechanical properties. Photographs and drawings. (E22, N12, Cu)

528-E. The Why of Gate and Feeder Design. Frederick G. Sefing. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 75-80; disc., p. 80-81.

Basic principles of design with illustrated examples. Includes table of theoretical feeder capacity for gray iron (three types), white iron (two types), steel, and Ni-Resist. (E22, CI)

529-E. Gating and Risering of Malleable Iron Castings. E. C. Zirzow. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 82-91; disc., p. 82.

Brief discussion and nine pages of photographs showing actual production patterns. (E22, CI)

530-E. Gating and Risering of Copper-Base Alloy Castings. W. W. Edens. American Foundrymen's Society "Symposium on Principles of Gating", 1951, p. 92-93.

Emphasis on solidification characteristics of four Cu-base alloys; red brass 85-5-5-5, Navy G, 70000 Mn bronze, and Al bronze. (E22, Cu)

531-E. Foundry Quality Control. A. A. Evans. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 381-392.

Experiences and procedures at International Harvester Co. Photographs and charts. (E general, S12)

532-E. Production of Ingot Moulds by Sandslinger in a Mechanized Foundry. J. Raymond Jones. *Foundry Trade Journal,* v. 93, July 24, 1952, p. 101-105; July 31, 1952, p. 131-135.

Equipment and procedures of British firm. (E11, CI)

533-E. Aluminium Matchplate Patterns by the Pressure-Cast Plaster Process. I. American Practice. E. C. Mantle. **II. British Developments.** D. H. Potts. *Foundry Trade Journal,* v. 93, July 31, 1952, p. 117-124; disc., Aug. 7, 1952, p. 157-160.

Descriptions include numerous illustrations. (E16, Al)

534-E. Production of Sound Castings. H. W. Griffiths. *Foundry Trade Journal,* v. 93, Aug. 7, 1952, p. 153-155; disc., p. 155-156.

The main emphasis is on running and feeding methods. Chiefly concerns exothermic material and Connor-block running. Numerous diagrams. (E23)

535-E. Process Control of Cast Iron for Vitreous Enamelling. *Foundry Trade Journal,* v. 93, Aug. 7, 1952, p. 163-166.

Discussion of paper by J. Bernstein in June 5 and July 10 issues; see item 491-E, 1952. (E11, L27, CI)

536-E. Charge-Level Indicator for Cupolas. *Foundry Trade Journal,* v. 93, Aug. 7, 1952, p. 167.

Briefly described and diagrammed. (E10)

537-E. Role of the Research Foundry Unit. G. A. Lillieqvist. *Foundry Trade Journal,* v. 93, Aug. 7, 1952, p. 145-152; Aug. 14, 1952, p. 187-191; disc., Aug. 21, 1952, p. 217-219.

Emphasis on organization of American Steel Foundries, Inc., East Chicago, Ind. Laboratory layout and some specific projects. Diagrams, graphs, and illustrations. (E general, A9, CI)

538-E. Foundry: Shell Molds for Job Shops. K. W. Bennett. *Iron Age,* v. 170, Aug. 21, 1952, p. 63.

A Chicago company is considering selling shell molds on a jobbing basis to smaller foundries in the Midwest. Molds would be made by Powdered Metal Products Corp. on a new machine which the company has built and tested. (E16)

539-E. Foundry Mechanization; a Survey of Modern Methods and Equipment. J. Bain. *Iron & Steel,* v. 25, July 1952, p. 329-332; Aug. 1952, p. 369-372.

Belt conveyers, bucket elevators, magnetic separation, screens, chutes and storage hoppers; also new sands and bonding materials, sand mills, disintegrators, molding machines, mold conveyers, pouring runways, casting-cooling conveyers, and core shops. Diagrams. (E general, A5)

540-E. Dowlais Foundry. *Iron & Steel,* v. 25, Aug. 1952, p. 367-368.

Account of how a British foundry has been modernized to meet present demands. (E general)

541-E. Synthetic Resins; Application in Coremaking and Moulding. *Iron & Steel,* v. 25, Aug. 1952, p. 379-380. (E18)

542-E. A Shell Moulding Process. *Light Metals,* v. 15, Aug. 1952, p. 268-269.

Use of new technique for making complex parts of alloy steel, by Polygram Casting Co., London. (E16, AY)

543-E. Discussion on "Modern Foundry Practice". *North East Coast Institution of Engineers and Shipbuilders Transactions,* v. 68, July 1952, p. 121-128.

Discussion of paper by T. W. Bushnell (item 402-E, 1952). Includes author's replies. (E general, CI)

544-E. Relation Between Melting Conditions and Casting Defects in Iron Casting. Nobutaro Kayama. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 3-5.

Experimental procedure. Results tabulated, illustrated, and discussed. Effect of mechanism of oxidation and reduction. (E25, CI)

545-E. Studies of Gases Evolved on Solidification of Molten Cast Iron. Ichiro Iitaka and Minao Otsuka. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 15-16.

Experimental results on cupola iron and Swedish charcoal pig iron, with seven different treatments. Graphs. (E25, CI)

546-E. Studies of Gases Evolved on Solidification of Molten Cast Iron. Minao Otsuka. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 26-30.

Experimental apparatus diagrammed. Data tabulated, charted, and discussed. (E25, CI)

547-E. Studies on Metal Penetration in Castings. Jiro Kashima. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 31-36.

Experiments were conducted on a series of Cu alloys with Zn, Sn, Al, and Sn+P; on effects of mold washes; and on oxidation rate of various types of Cu-alloy castings at elevated temperatures. Tables and graphs. (E19, Cu)

548-E. Studies on Molding Sand Binders. Toshisada Makiguchi. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 37-42.

Influences of concentration of H ion in water added to inorganic binders, especially clay-type binders. Variation of binding strength when acid, alkali, or strong electrolytes were mixed into water added to a kaolin or montmorillonite type binder. Variation of degree of sedimentation of the clay suspension, as well as the relationship between variation of binding strength and that of degree of sedimentation. Tables and graphs. (E18)

549-E. Studies on Camlachie Cramp. Tsunemitsu Muraki. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 43-45.

Fusion between foundry chaplets and the metal being cast was studied. Soft-steel chaplets plated with Ag, brass, Cu, Ni, and Cr were used in a dry sand mold and gray iron cast around them. Microstructure of the interfaces between chaplet stems and the cast iron was studied. Use of powdered metals bonded with silicates or linseed oil was also studied. Results are charted, tabulated, and illustrated. (E19, CI)

550-E. On the Flow-Dynamic of Molten Metals. Kiyoshi Yokota. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 52-55.

Flow rates of molten Hg along paraffin channels (various degrees of smoothness) were studied, as an aid in study of optimum conditions for pouring of molten metals into molds. Diagrams and graphs. (E25)

551-E. (German.) **Synthetic Casting Sand, Its Application and Usefulness in Gray Iron and Steel Casting.** H. Gries and W. Trommer. *Giesserei,* v. 39, July 10, 1952, p. 333-341.

Types of sand, control of composition, costs, characteristics of sands used, and results achieved with various types in the foundry. Diagrams, charts, and photographs. 28 ref. (E18, CI)

552-E. (German.) **Use of Synthetic Molding Sands.** K. Houben. *Giesserei,* v. 39, July 1952, p. 341-343.

Various types. Illustrations show molds and cores for several large machinery castings, made of synthetic sand. (E18, CI)

553-E. Melting Practice for Magnesium-Base Alloys. L. W. Eastwood. *Canadian Metals,* v. 15, Aug. 1952, p. 34, 36-38.

See abstract of "Melting Aluminum and Magnesium-Base Alloys," *Transactions of the American Foundrymen's Society,* item 66-E, 1952. (E10, Al, Mg)

554-E. Revolution in the Foundry. *Canadian Metals,* v. 15, Aug. 1952, p. 40-41.

Pros and cons of shell molding now being used in foundry work. (E16)

555-E. Designing for Shell Molded Castings. *Electrical Manufacturing,* v. 50, Sept. 1952, p. 119-121, 328, 330, 332, 334.

Advantages and pattern design. Method can be used to cast gray, nodular, and malleable iron; low-carbon, high-alloy, high-Cr alloy, and Types 304 and 316 stainless steels. (E16, CI, CN, AY, SS)

556-E. Statuary to Electronics Via Plaster Molding. Frank Pfister. *Foundry,* v. 80, Sept. 1952, p. 86-91.

Casting in plaster of solid-solution alloys with attention to individual processes. Photographs show phases of molding, and type of castings produced. (E16)

557-E. Sand Reclamation at the Eddystone Plant. Karl S. Howard and Clyde B. Jenni. *Foundry,* v. 80, Sept. 1952, p. 92-95, 272, 274, 276.

Methods, advantages, and cost. Photographs, tables, and diagram. (E18)

558-E. Develops New Process for Casting Stock Bushings. J. Gilbert Hill. *Foundry,* v. 80, Sept. 1952, p. 98-99.

New method developed by M. L. Hart, Oklahoma City. The molds are formed in a vertical position and then filled with metal while in a horizontal position. The castings are claimed to be superior in many respects to those made by conventional methods. (E19)

559-E. Core Serves as Gate and Riser. Ben F. Sweet. *Foundry,* v. 80, Sept. 1952, p. 96-97, 236.

Method devised for use in blank gears and sprocket wheels. Explanation and diagrams. (E22)

560-E. Enlarged Malleable Iron Foundry Is Model of Good Housekeeping. Frank G. Steinbach. *Foundry,* v. 80, Sept. 1952, p. 100-105, 278, 280-282, 284.

Equipment and practices at Albion Malleable Iron Co., Albion, Mich. (E11, CI)

561-E. Accuracy Is Byword in Fine-Hardware Foundry. *Foundry,* v. 80, Sept. 1952, p. 106-107, 212, 214.

A general description of the Chautauqua Hardware Corp., Jamestown, N. Y., which specializes in bronze and brass hardware. (E11, Cu)

562-E. Casting Stainless Steel in Shell Molds. *Foundry,* v. 80, Sept. 1952, p. 108-111.

(E16, SS)

563-E. Miniature Cupola Aids in Melting Study. John F. Drenning. *Foundry,* v. 80, Sept. 1952, p. 151.

Measurements, performance, and availability. (E10, CI)

564-E. Plaster and Plastics Combine in New Pattern Material. Thomas A. Dickinson. *Foundry,* v. 80, Sept. 1952, p. 174, 177, 180.

Patterns are made by casting and dehydrating least expensive types of plaster, so that the latter can be impregnated with polymerizable-resin solutions. It is then possible to heat-cure casts to be comparable to wood or cast plastic articles for practical purposes. (E17)

565-E. Increasing Scrap Charging in the Cupola. Lewis H. Gross. *Foundry,* v. 80, Sept. 1952, p. 182, 187-188, 190.

Good castings can be made from Fe melted in cupola where the charge contains high percentage of scrap, by use of metallurgical knowledge. Recommended procedures. (E10, CI)

566-E. Investment Casting. Roy W. Tindula. *Foundry,* v. 80, Sept. 1952, p. 193-194, 196, 198, 201, 204, 207, 208.

History and present status of investment precision casting or lost-wax process. 73 ref. (E15)

567-E. Purdue University Converts to Modernized Foundry. James W. Mayer. *Foundry,* v. 80, Sept. 1952, p. 266, 268, 270.

Purpose of foundry program is to provide foundry experience for engineers, actual production of castings, and research. (E general, A9)

568-E. Methods Employed in the Production of Heavy Iron Castings. J. Richardson and C. F. Lawson. *Foundry Trade Journal,* v. 93, Aug. 14, 1952, p. 173-179; Aug. 21, 1952, p. 207-215; Aug. 28, 1952, p. 247-248.

A few examples of heavy castings, their main features and problems. Production methods and general principles applicable to a variety of castings. (E11, CI)

569-E. Insulating Feeders for Use With Copper-Alloy Sand Castings. R. A. Skinner and R. W. Ruddle. *Foundry Trade Journal,* v. 93, Aug. 14, 1952, p. 181-184; disc., p. 184-185.

Use of plaster sleeves to decrease the size of feeders and to increase yields. Diagrams and graphs. (E23, Cu)

570-E. Simple Mechanical Layout for the Jobbing Brass Foundry. F. C. Evans. *Foundry Trade Journal,* v. 93, Aug. 21, 1952, p. 201-203; disc., p. 203-205.

Plant has been operated with great success in a number of American brass foundries. How similar results can be obtained with standard British equipment. (E general, Cu)

571-E. Many Mechanisms at Work Producing Grain Refinement in Light Metals. Harold Bernstein. *Journal of Metals,* v. 4, Sept. 1952, p. 926-930.

Growth restriction theories, adsorption effect, surface tension, nucleation theories, nucleation by foreign particles, and effect of vibration. Tables, graphs, photographs illustrate results of study of Al, Cu, Ti, Zn. 15 ref. (E25, Al, Cu, Ti, Zn)

572-E. Foundry Practice at the Winget Meehanite Foundry. D. F. Knight. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 16, 1952, p. 81, 83, 85-88.

Production of Meehanite castings from a few ounces up to 2½ tons at British foundry. (E11, CI)

573-E. A New Die Casting Machine. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 16, 1952, p. 101, 103, 105-106.

The die-casting process, materials used, and difference between hot and cold-chamber working. A new self-contained semi-automatic die-casting machine. (E13)

574-E. Mechanized Production of Cast Iron Pipes. *Machinery* (London), v. 81, Aug. 21, 1952, p. 311-318.

New foundry of the Carron Co. Works, Falkirk, Scotland. (E general, CI)

575-E. Pressure Die-Casting of Aluminium. (Concluded.) **Part VI. Selection of Die Steel. Part VII. Preparation of Die for Foundry. Part VIII. Ancillary Equipment.** H. J. Sharp. *Metal Industry,* v. 81, Aug. 8, 1952, p. 109-112; Aug. 15, 1952, p. 123-125. (E13, Al)

576-E. Solidification of Steel. *Metal Progress,* v. 62, Sept. 1952, p. 172, 174, 176. (Condensed from "Solidification of Steel From Sand and Chill Walls", H. F. Bishop, F. A. Brandt, and W. S. Pellini, *Naval Research Laboratory,* Report 3785, Jan. 4, 1951).

See abstract based on *American Foundrymens Society,* Preprint 51-22, Apr. 1951, item 282-E, 1951. (E25, N12, CI)

577-E. Synthetic Resins for the Foundry. *Plastics,* Aug. 1952, p. 231-232, 234.

Pros and cons in relation to core binding, dielectric drying techniques, shell-molding methods, etc. (E18)

578-E. Melting Metals in Space. *Westinghouse Engineer,* v. 12, Sept. 1952, p. 171-172.

See abstract of "Metals Melted Without Crucibles", E. K. Okress and D. N. Wroughton, *Iron Age,* item 495-E, 1952. (E10, Al, Ti, Ag, EG-d)

579-E. (French and German.) **Light Metal Sand Castings.** J. P. Meister. *Aluminium Suisse,* v. 2, July 1952, p. 136.

Advantages and range of application. (E11, T general, Al, Mg)

580-E. (German.) **Application of the Jet Process for the Repair of Burnouts in Cupolas.** Kurt Krämer and Otto Reinsberg. *Giesserei*, v. 39, July 24, 1952, p. 357-362.

The Torkret process. Types of materials used for the jets, and experiments with various semi-synthetic compounds. Economic advantages of the method. Tables, charts, and diagrams. (E10)

581-E. (German.) **A New Foundry.** K. Mallener and J. Stadler. *Giesserei*, v. 39, July 24, 1952, p. 362-366.

Improved layout and its advantages. Diagrams. (E general)

582-E. (German.) **A Foundry With Coreless Line-Frequency Induction Crucible Furnaces for Melting of Magnesium Alloys.** W. Zschintzsch. *Giesserei*, v. 39, Aug. 7, 1952, p. 381-387.

Installation developed in Germany after the war. Construction details and experiences. (E10, Mg)

583-E. (German.) **The Application of Synthetic Sands, Including Cement Sands.** E. Lange. *Giesserei*, v. 39, Aug. 7, 1952, p. 387-390.

Advantages and disadvantages of the use of exclusively synthetic sands in the foundry. Types of sand, effect of grain size, and water and cement content. Examples of practical application. Tables and graphs. (E18)

584-E. The Job Record Card, a Valuable Tool for the Jobbing Foundry. R. W. Griswold. *American Foundryman*, v. 22, Sept. 1952, p. 34-36.

System developed at Erie Malleable Iron Co., Erie, Pa. Furnishes enough data to prepare any job for production and run it the same way every time. (E general, A5)

585-E. Small Foundry, Small Castings. *American Foundryman*, v. 22, Sept. 1952, p. 37-39.

Plant of Goltra Foundries, Inc., Barrington, Ill., which specializes in small, precise castings. Layout diagram and photographs. (E general, A5)

586-E. Foundry Crucible Service Life. R. A. Heindl. *American Foundryman*, v. 22, Sept. 1952, p. 40-43.

Relative merit of crucibles manufactured from Alabama, Pennsylvania, and Madagascar graphites. Bonding agents, flake size in crucible mixes, and mechanical properties. Tables and photographs. (E10)

587-E. The Nonferrous Cleaning Room. Martin G. Dietl. *American Foundryman*, v. 22, Sept. 1952, p. 44-49.

See abstract from *Foundry;* item 322-E, 1952. (E24, Cu)

588-E. The Truth About Disease Caused by Foundry Dusts. O. A. Sander. *American Foundryman*, v. 22, Sept. 1952, p. 53-54. (E general, A7)

589-E. Causes of Hot Tears in Steel. *American Foundryman*, v. 22, Sept. 1952, p. 59-62.

Discussion by seven Texas foundrymen on experiences with hot tears in steel castings. (E25, CI)

590-E. Design-Production Teamwork Is Key to Steel Foundry Gains. J. O. Felt. *American Foundryman*, v. 22, Sept. 1952, p. 65-67.

How castings can be improved through the use of cooperative design, and how jobs normally lost to the foundry can be captured. Illustrated examples of steel drive spacers for tractors, hydraulic cylinder heads, trailer axle, machinery hinge basket, and rockers and stop baskets for an end dump hopper. (E general, CI)

591-E. Melting Control by Cupola Pyrometer. R. I. Taylor. *Foundry Trade Journal*, v. 93, Aug. 28, 1952, p. 229-232.

Present methods of cupola control, based on use of volume and pressure meters, leave much to be desired. Use of a recording pyrometer. Diagram shows recommended pyrometer location. Typical chart records of temperature are presented and discussed. (E10, S16, CI)

592-E. Shell Molding. Roger W. Bolz. *Machine Design*, v. 24, Sept. 1952, p. 160-162.

Illustrated description. (E16)

593-E. Core Baking by High-Frequency Dielectric Heating. J. Meilink. 4th International Mechanical Engineering Congress, June 1952, 19 pages.

Use and advantages of thermosetting-resin binders. Influence of variables on core properties. Data on iron castings. Diagrams and graphs. (E21, CI)

594-E. Development of High-Duty Cast Iron; Austrian Activities. Roland Mitsche and Rolf Weinberger. 4th International Mechanical Congress, June 1952, 7 pages.

Reviews earlier development and summarizes research and development activities of the Austrian High Strength Cast Iron Committee. Diagrams show results of graphite modification by various methods. (E general, CI)

595-E. (German.) **New Results With Cement-Sand Casting.** M. Beilhack. *Giesserei*, v. 39, Aug. 21, 1952, p. 405-410.

Reviews various processes. Results with different types of cements, and with different cement and water content. Examples for a new process using fully synthetic, automatically hardening, plastic sand. Graphs and photographs. (E16, E18)

596-E. (Portuguese.) **Casting of Cylinder Blocks.** Lino A. de Lacerda Santos and Manoel A. Moraes. *Boletim da Associacao Brasileira de Metais*, v. 8, Jan. 1952, p. 5-19.

Possibility of casting in a horizontal position and using an ordinary molding machine for series production. Schematic drawings and tables. (E11, E19, CI)

597-E. (Russian.) **Remelting Cathode Zinc in Induction Furnaces With Steel Cores.** P. F. Sabaneev. *Promyshlennaia Energetika*, v. 9, Jan. 1952, p. 4-7.

Design and operation of furnaces for melting zinc. Diagrams. (E10, Zn)

598-E. (Swedish.) **Production and Productivity in the American and the Swedish Steel Casting Industries.** Stig H. Ljunggren. *Jernkontorets Annaler*, v. 136, No. 6, 1952, p. 131-155.

On the basis of available statistical data and a visit to a number of steel foundries in the U. S., an attempt is made to analyze the causes of the difference in productivity between the two countries. As representative figures for productivity, the author gives for the U. S. 96 and for Sweden 160 man-hours per metric ton of steel castings produced. About 1/3 of the difference is explained by more complete mechanization in American steel foundries and by other metallurgical factors. Another 1/3 is due to the fact that a considerable part of American steel castings are produced in large volume and machine molding is therefore widely used. Also the average size of American steel foundries is about six times that of Swedish. The last third of the difference is probably mainly explained by higher working intensity in American foundries. 14 ref. (E general, A5, CI)

599-E. (Book.) **The Art and Science of Founding.** N. L. Bush. 333 pages. Angus & Robertson, Ltd., London, England.

Written as a text for trade schools, technical colleges, and as a reference for metallurgists, engineers, and foundry workers. More useful for practical information than for technical phases. Mechanization and equipment are described in greater detail than commonly found. (From review in *American Foundryman.)* (E general)

600-E. (Book.) **Copper-Base Alloys Foundry Practices.** Ed. 2. 232 pages. 1952. American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill.

Recommendations in general and for the various types are presented in comprehensive detail. Numerous tables, diagrams, and illustrations. (E general, Cu)

601-E. (Book.) **Symposium on Principles of Gating.** 95 pages. 1951. American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. $4.10.

Eleven papers presented at the 55th annual meeting of American Foundrymen's Society, Buffalo, N. Y., Apr. 24, 1951. Individual papers are separately abstracted. (E22)

602-E. (Book—German.) **Chemie in der Giesserei.** (Chemistry in the Foundry.) E. Wagner. 84 pages. 1952. Verein Deutscher Giesserei Fachleute, Dusseldorf, Germany. 3.60 DM.

Intended to make molders and coremakers understand the chemical facts that underlie their trade. Fundamental facts are explained in an easily understandable manner, although an expert chemist might take exception to some of the explanations. Should be of value to younger men and to instructors in apprentice courses. Whole field of chemistry, except physical chemistry, covered. —W. Trinks. (E general, P13)

603-E. (Book—German.) **Physik in der Giesserei.** (Physics in the Foundry.) L. Frede. 138 pages. 1952. Verein Deutscher Giesserei Fachleute, Dusseldorf, Germany. 6.80 DM.

Intended to make molders and coremakers understand the physical facts that underlie their trade. Fundamental facts are explained in an easily understandable manner, although an expert physicist might take exception to some of the explanations. Should be of value to younger men and to instructors in apprentice courses. The whole field of physics, except nuclear (atomic) physics, is covered.—W. Trinks. (E general, P general)

F

PRIMARY MECHANICAL WORKING

256-F. Heat Exchangers Require Precise Fabrication. F. A. Guba. *Iron Age*, v. 170, Aug. 21, 1952, p. 127-129.

Basic factors in successful tube expanding: Tube characteristics, tube-sheet characteristics, tube and tube-sheet preparation, workmanship, and physical properties of steel used. (F26, ST)

257-F. The Rendleman Rod Mill. Norman Rendleman and A. Wilson. *Iron and Steel Engineer*, v. 29, Aug. 1952, p. 77-83; disc., p. 83.

Rod mill is essentially a 3-strand mill with three lines employed to roll 400, 500, or 600-lb. billets into any size of rod. In operation, the mill approaches the equivalent of three single-strand mills. Fundamental components are organized in a new and highly advantageous way. Details are illustrated diagrammatically. (F23, ST)

258-F. New Magnesium Rolling Mill Starts Operation. *Magazine of Magnesium*, Aug. 1952, p. 4-5.

Picture story of Brooks & Perkins Livonia Mill Div. (F23, Mg)

259-F. The Deformation Through the Die by Drawing of a Rod. Hiroshi Yamanouchi and Ikuhiko Hayashi. *Reports of the Casting Research Laboratory*, No. 3, 1952, p. 61.

Research on four steel test pieces through a steel die having different die angles with three components of linear natural strain and additional shear strain. Shear-stress diagrams. (F27, Q24, CN)

260-F. An Examination of Modern Theories of Rolling in the Light of Rolling Mill Practice. IV. Theory and Practice of Tension and Gauge Control in Modern Production Mills. N. H. Polakowski. *Sheet Metal Industries*, v. 29, Aug. 1952, p. 709-715.

Includes schematic and circuit diagrams. 23 ref. (F23)

261-F. Details of a New High Precision Hot Rolling Line Installed at Sandvikens Jernverks AB. *Sheet Metal Industries*, v. 29, Aug. 1952, p. 717-722.

Swedish mill for high-carbon and stainless steels. Diagrams and illustrations. (F23, CN, SS)

262-F. The ABC of Extrusion. Andrew E. Rylander. *Western Machinery and Steel World*, v. 43, Aug. 1952, p. 104-107.

Basic elements and several methods in current use. Schematic sketches and drawings of tooling for typical applications. (F24, G5)

263-F. (German.) **Friction Caused by Roll Pressure Corresponding to Various Elasticity Moduli.** Alfred Shäfer. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 253-256.

Proposes mathematical calculation for the boundary case of complete adhesion, and for the case of medium adhesion range, and for the final stages of flow. Theoretical results are verified by photo-elastic experiments. Graphs. (F23, Q24)

264-F. (German.) **Rolling Program and Rolling Diameter in Cold Rolling of Brass Strip and Plate. Part I.** Karl-Heinz Lucas and Otto Emicke. *Metall*, v. 6, Aug. 1952, p. 417-426.

Continuous cold-rolling processes. Advantages of modern methods. Tables and graphs. (F23, Cu)

265-F. Pair Forging Makes Giant Rotor Disks. *American Machinist*, v. 96, Sept. 1, 1952, p. 138-139.

Problems which faced Bethlehem Steel in producing rotor disks for NACA's new supersonic wind tunnel. Operations. (F22, ST)

266-F. The Measurement of Strip Tension in Tandem Mills. R. B. Sims. *Engineering*, v. 174, Aug. 22, 1952, p. 232-233; Aug. 29, 1952, p. 262-264.

Includes diagrams, photographs of apparatus, and tables. (F23, ST)

267-F. Strip Rolled to 0.0002 In. on New Small Mill. Robert L. Stockus. *Iron Age*, v. 170, Sept. 4, 1952, p. 156-159.

New and unique rolling mill developed by the Armzen Co., Waterbury, Conn., which will cold roll electrical alloys to 0.0002 in. (F23)

268-F. Giant Rotor Forgings Hard to Handle. *Iron Age*, v. 170, Sept. 11, 1952, p. 88.

See abstract of "Pair Forging Makes Giant Rotor Disks." *American Machinist*, item 265-F, 1952. (F22, ST)

269-F. The New Heavy Forge at Hadfields, Ltd. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 413-419.

Description and layout diagrams. (F22, CN)

270-F. B & W's Giant Press Forms Heavy Plate, Pierces Ingots for Hollow Forgings. *Journal of Metals*, v. 4, Sept. 1952, p. 922-923.

Operation of the press. (F22, G1, ST)

271-F. Diamond Wire-Drawing Dies. R. E. Leeds. *Metal Industry*, v. 81, Aug. 22, 1952, p. 147-148.

Steps in making the dies and a method for reducing time of piercing by 50 to 1. An electric spark is used. Photographs and diagrams. (F28)

272-F. Impact Forging Strong Aluminum Alloys. R. A. Quadt. *Modern Metals*, v. 8, Aug. 1952, p. 43-44.

New process called cold-impact forging now employed at Riverside, Calif., plant of Hunter Douglas Corp. (F22, Al)

273-F. High-Geared Production With Induction Heating. *Steel*, v. 131, Sept. 8, 1952, p. 88-92.

Increased output in forging of transmission gears is achieved by conversion to induction heating at Chevrolet Saginaw Transmission Div. (F22, ST)

274-F. Wide Strip Mill Opens World of New Ideas. Frank H. Fanning. *Steel*, v. 131, Sept. 8, 1952, p. 100, 102, 104.

See abstract of "Wide Strip Mills —Evolution or Revolution?" *Blast Furnace and Steel Plant*, item 250-F, 1952. (F23, CN)

275-F. Design of Forging Press Die Bolsters. E. W. Mace. *Steel Processing*, v. 38, July 1952, p. 335-339; Aug. 1952, p. 385-387.

Desirable points sought in die-bolster design. Schematic drawings. (F22, T5)

276-F. New Furnaces Installed for Shell Forging Work. Arthur Q. Smith. *Steel Processing*, v. 38, Aug. 1952, p. 396-398.

See abstract of "Forging and Heat Treating of Shells is Speeded by Newest Equipment", *Industrial Gas*, item 145-F, 1952. (F21, J general, ST)

277-F. From Ingots to Steel Pipes. *Welding Engineer*, v. 37, Sept. 1952, p. 36-38.

Manufacture of welded steel pipes from ore to finished product at Wheeling Steel Corp. Photographs show steps in the procedure. (F26, CN)

278-F. Calculating Aids in Wire Drawing. Karl Schimz. *Draht* (Wire) (English Ed.), July 1952, p. 31-35.

Numerical examples and nomograms. (F28)

279-F. (Japanese.) **Research on Back-Tension Wiredrawing.** Hiromu Suzuki. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, No. 3, Dec. 1950, p. 73-118.

Rheological characteristics of deformation caused by drawing, mechanical properties of drawn wires, and mechanical characteristics of wiredrawing machines. Graphs and diagrams. (F28, Q24)

280-F. Accurate Methods—Precision Tubes. Paul V. Fly. *Instrumentation*, v. 6, 3rd. qtr., 1952, p. 17.

Previously abstracted from *Steel;* see item 253-F, 1952. (F26, J23, SS)

281-F. Strip and Wire Drawing; a Simple Account of Modern Theory. J. G. Wistreich. *Iron & Steel*, v. 25, Sept. 1952, p. 391-395.

Some features of modern plasticity theory covering such topics as work hardening and equivalent mean strain; effect of friction; strip-drawing theory; and wire-drawing theory. Graphs. (F23, F28, Q23)

282-F. Drop-Forging Practice in Australia. H. J. Merchant. *Metal Treatment and Drop Forging*, v. 19, Aug. 1952, p. 335-341.

Survey of progress plus a description of drop-forging facilities and practices of Australian Forge and Engr. Pty., Ltd., Sydney, N. S. W. (To be continued.) (F22)

283-F. The Development and New Applications of Cold-Flow Pressing of Steel. Karl Sieber. *Draht* (Wire) (English Ed.), July 1952, p. 26-30.

Previously abstracted from *Machinery* (London); see item 167-F, 1952. (F22, F24, ST)

284-F. (German.) **The New Roughing Mill of the Steel Plant at Donawitz.** Othmar Kammerhofer. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 1025-1034.

Details described, diagrammed, and illustrated. Data are tabulated. (F23, ST)

285-F. (Italian.) **Reviewing the Modern Production of Hot Rolled Strip on Continuous Mills.** Marco Gatti. *Metallurgia Italiana*, v. 44, July 1952, p. 251-258.

Recent developments, particularly in the U. S. Equipment is diagrammed. (F23, ST)

286-F. (Book—German.) **Was der Mann aus der Schiede von seiner Arbeit wissen muss.** (What the Man in the Forge Shop Must Know About His Work.) A. Schwartz. 126 pages. Stahleisen m.b.h., Düsseldorf, Germany, 7.20 DM.

An intensely practical book, which covers almost all of the operations performed in a forge shop. Each operation is illustrated by one or more sketches so clear that the text can almost be dispensed with. Deals not only with the forging operations proper, but with furnace practice, with crane operation, and with health and safety. (From review in *American Machinist.)* (F22)

G

SECONDARY MECHANICAL WORKING

427-G. Alloyed-Titanium Tooling. *Aero Digest*, v. 65, Aug. 1952, p. 17-19.

Headaches involved in fabrication of Ti alloys for production dies. Problems encountered in connection with drilling, stamping, and forming Ti alloys. (G general, Ti)

428-G. Electric-Spark Erosion. *Aircraft Production*, v. 14, June 1952, p. 271-274.

See abstract of " 'Machining' Hard Metals by Electric Spark", *Engineering*, item 431-G, 1952. (G17)

429-G. The Effect of Shot Peening on Damage Caused by Cavitation. Nicholas Grossman. *ASTM Bulletin*, July 1952, p. 61-66.

Shot peening was found to reduce cavitation damage of two carbon steels and one brass. The amount of decrease varied from 7 to 58% for the different materials. Apparatus and procedure. Results are tabulated, charted, and illustrated. (G23, Q9, CN, Cu)

430-G. Ford Body Parts Made in Modernized Plant. Joseph Geschelin. *Automotive Industries*, v. 107, Aug. 15, 1952, p. 34-38.

Dearborn Stamping Plant. Forming and spot and seam welding equipment. (G3, G4, K3, CN)

431-G. "Machining" Hard Metals by Electric Spark. *Engineering*, v. 174, July 25, 1952, p. 121-122.

Equipment developed by British firm. Schematic diagrams and illustrations. (G17)

432-G. Four-Roll Plate-Bending Machine. *Engineering*, v. 174, Aug. 1, 1952, p. 140-141.

Equipment made by a British firm. (G6)

433-G. Cold-Rolled Fillets. R. J. Love. *Engineering*, v. 174, Aug. 8, 1952, p. 164.

A process devised for strengthening fillets, consisting of cold rolling

with steel balls, has given striking results. It was used on cast crankshafts of flake-graphite iron. Fatigue test results show that, under reversed bending, cold rolling increased the limiting stress of crankshafts by 60% and that under "one-way" loading, the increase of strength was as much as 80%. Graphs and diagrams. (G23, Q7, ST)

434-G. Abrasive Belts Taper Aluminum Plate. *Iron Age,* v. 170, Aug. 21, 1952, p. 130-131.

Equipment for putting the taper and finish on Al plate for aircraft wings. It can remove as much as 0.01 in. of stock in one pass, over entire width of plates 72 in. wide. Roughing and finishing can be done in same machine. (G18, Al)

435-G. Babcock & Wilcox Installs New Forming Equipment. *Iron and Steel Engineer,* v. 29, Aug. 1952, p. 143, 145.

New vertical press and horizontal drawbench for producing hollow forgings and for bending heavy plate. Diagrams and illustrations. (G1, ST)

436-G. Forming, Polishing, and Machining Magnesium. *Materials & Methods,* v. 36, Aug. 1952, p. 133.

Tabular presentation of formabilities, tube-bending radii, procedure, tool materials for machining, and coolants for machining. (G general, L10, Mg)

437-G. Diversified Metalworking Behind Cleveland Trencher's Versatile Machines. Walter Rudolph. *Modern Industrial Press,* v. 14, Aug. 1952, p. 13-14, 16, 18, 22.

Picture story of equipment and procedures of Cleveland Trencher Co., Cleveland, Ohio, in production of mechanical trenching equipment. Includes flame cutting, press forming, riveting, welding, punching, and bending. (G general, K general, CN)

438-G. Manufacturing Specialized Steel Products. Howard E. Jackson. *Modern Industrial Press,* v. 14, Aug. 1952, p. 28, 30, 34, 36, 50.

Procedures and equipment of Hydraulic Supply Mfg. Co., Seattle, Wash., in making a diversified line of hydraulic mining equipment. Includes shearing, slotting, punching, and welding. (G general, CN)

439-G. An Automatic Machine Tool. William Pease. *Scientific American,* v. 187, Sept. 1952, p. 101-110, 112, 114-115.

A milling machine that converts information on punched tape into the contours of a finished part. Photographs and diagrams. (G17)

440-G. Refrigerator Production at Luton. *Welding and Metal Fabrication,* v. 20, Aug. 1952, p. 274-280.

Forming, gas welding, spot welding, and finishing procedures and equipment of British firm. (G general, K2, K3, L general)

441-G. Torture Chambers. W. P. Brotherton. *Western Machinery and Steel World,* v. 43, Aug. 1952, p. 82-84.

Production of jet-engine combustion chambers at Ryan Aeronautical Co., San Diego. Outer chambers are of stainless steel and inner of Inconel. Operations include pressing, piercing, tube forming, and seam and spot welding. Photographs. (G general, F26, K3, Ni, SS)

442-G. New Rod Converts Welding Machine Into Cutting Tool. Arthur L. Phillips. *World Oil,* v. 135, Aug. 1952, p. 260, 262.

How two new flux-coated electrodes enable a welder to use his welding machine for cutting and burning all kinds of metals—even cast iron. Heat generated by the welding machine is concentrated in a small area by the flux on the rod. At the same time the flux generates a gas shield which prevents oxidation of the cut. (G22)

443-G. New Stretch-Forming Techniques. Frank Charity. *American Machinist,* v. 96, Sept. 1, 1952, p. 113-115.

Method by which North American Aviation, Inc., produces larger unit parts, and minimizes trimming scrap by using stretch-forming techniques with soft, annealed, or half-hard sheet Al. (G9, Al)

444-G. How to Select a Cutting Fluid. *American Machinist,* v. 96, Sept. 1, 1952, p. 118-120.

Properties of cutting fluids may be varied by altering their composition so they are useful for a large number of applications. Considerations of tap water, tap water + anti-corrosive additives, high and low oil content emulsions, and weights of oils. (G21)

445-G. Don't Overlook Operator Safety in Press-Tool Design. L. A. Faulkner. *American Machinist,* v. 96, Sept. 1, 1952, p. 121-134.

Safety practices by means of good design and barriers in primary and secondary operations. Diagrams and photographs. (G1)

446-G. Correlation of Machinability With Inclusion Characteristics in Resulphurized Bessemer Steels. Lawrence H. Van Vlack. *American Society for Metals,* Preprint 16, 1952, 13 pages.

Some of the factors affecting shapes and sizes of inclusions in rolled resulfurized steels. These inclusion characteristics are governed by Si and S contents of the steel, mechanical working which the steel receives, and possibly by O_2 content of the sulfide phase. These characteristics, in turn, influence machinability of the steels when other metallurgical factors are equal. (G17, M28, CN)

447-G. The Influence of Insoluble Phases on the Machinability of Titanium. R. M. Goldhoff, H. L. Shaw, C. M. Craighead, and R. I. Jaffee. *American Society for Metals,* Preprint 30, 1952, 25 pages.

Machinability of Ti is shown to be very sensitive to strength level and to machining conditions. It doubles when purity is increased from that of the commercial Mg-reduced grade to that of the high-purity iodide Ti. Similarly, when the tool-thrust load is increased or speed of cutting is decreased, machinability increases relative to free-cutting steel much more than does, say, 18-8 stainless steel. In an attempt to improve the machinability of Ti, alloy additions that formed insoluble phases with Ti were investigated. Some, like B, As, Te, S, and Se, made a moderate improvement in machinability when added in suitable amounts. Others, particularly carbon, were very detrimental to machinability. (G17, Ti)

448-G. Shop Practice: Forming, Machining, and Joining. C. Ridgely Kemp. *Engineer Research and Development Laboratories,* (Ft. Belvoir, Va.), "The Magnesium Symposium", Feb. 9, 1951, p. 59-64.

For Mg and its alloys. (G general, K general, Mg)

449-G. Band-Sawing Nonferrous Castings. H. J. Chamberland. *Foundry,* v. 80, Sept. 1952, p. 112-113, 220.

Types of saws and rates of cutting for castings of Al, Mg, and Cu. (G17, Al, Mg, Cu)

450-G. Machining Tungsten Carbide With Diamond Tools. G. B. Dauncey and R. S. Young. *Industrial Diamond Review,* new ser., v. 12, Aug. 1952, p. 161-164.

Turning and boring sintered carbide using a production model lathe with shaped and polished diamond-tipped lathe tools. (G17, W, C-n)

451-G. Hot Cupping, Cold Drawing Replace Machining Operations. G. F. Burnley. *Iron Age,* v. 170, Sept. 4, 1952, p. 152-153.

Savings in critical alloy steel and elimination of costly machining operations resulted from use of hot cupping and cold drawing to make 81-mm. shells from SAE 1010 steel billets at Rheem Mfg. Co., Richmond, Calif. Billets are induction heated at 2000° F. and hot forged in a 600-ton Ajax forging press. (G4, CN)

452-G. Radioactive Tools Permit Fast Tool Wear Studies. M. E. Merchant, Hans Ernst, and E. J. Krabacher. *Iron Age,* v. 170, Sept. 4, 1952, p. 154-155.

New method for speeding up machinability studies and other tests depending on measurement of tool wear by use of radioactivity. (G17, TS)

453-G. Radioactive Cutting Tools for Rapid Tool Life Testing. M. Eugene Merchant, Hans Ernst, and E. J. Krabacher. *Machine and Tool Blue Book,* v. 48, Sept. 1952, p. 236-240, 242.

See abstract of "Radioactive Tracers for Rapid Measurement of Cutting Tool Life," *Journal of Applied Physics,* item 105-G, 1952. (G17, S19, C-n)

454-G. More Production Through Better Understanding of Machinability. K. R. Blake. *Modern Machine Shop,* v. 25, Sept. 1952, p. 158-160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182-183, 186.

Velocity and area of contact, effect of tool shape, mechanism of failure in tool life, high speed steel tools, carbide tools, effect of cutting fluids, and work-tool thermocouple tests. Diagrams. (G17, T6, C-n, ST)

455-G. Titanium: It Can Be Formed and Drawn. Carter C. Higgins. *Steel,* v. 131, Sept. 8, 1952, p. 92-93.

Brief discussion. (G4, Ti)

456-G. The Design of Small Punches for Stamping. Federico Strasser. *Steel Processing,* v. 38, Aug. 1952, p. 382-384.

Information about standard and special design of small punches, as well as a few practical suggestions about how to solve problems which arise. Numerous diagrams. (G3)

457-G. Metal Removal by Oxygen Processes. E. M. Holub. *Steel Processing,* v. 38, Aug. 1952, p. 388-390.

The oxygen-cutting processes for removing metal, and other newer developments in this field. (G22)

458-G. (French.) **Saving of Material by the Use of a Device Fitted to Machine-Tools.** A. Fortier. 4th International Mechanical Engineering Congress, June 1952, 6 pages.

An automatic gage, Etamic, fitted to the machine tool for eliminating mass-produced parts which are outside the specified tolerance. The device can be easily adapted to all machine tools and is said to solve the reject problem. Diagram. (G17, S14)

459-G. The Stamping Property of Steel Material. E. M. H. Lips, W. de Vos, and H. v. Zuilen. 4th International Mechanical Engineering Congress, June 1952, 7 pages.

Life of a stamping tool in relation to quality of stamped material. Method for testing quality and experimental data for stampings made from phosphor bronze and from silicon iron. Theory. Tables and diagrams. (G3, Cu, Fe)

460-G. Testing of the Cutting Property of Materials for Mass Production. P. Wiest. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Machinability tests and a new quick method in which the material to be tested is machined by longitudinal turning with cutting speed increased in stages by permanent amounts from a certain initial speed up to failure of the cutting edge.

Tabular data on machinability of carbon and alloy steels using 5% tungsten steel tools and high speed tools. Derived relative machinability indexes for these steels (including American types). Diagrams, graphs, and photomicrographs.
(G17, CN, AY)

461-G. Spherical Joint; Rubber Forming of Stainless-Steel Tubes. *Aircraft Production,* v. 14, Sept. 1952, p. 297.

Forming method used by Accles and Pollock, Ltd., Oldbury, Birmingham. (G8, SS)

462-G. Men of "Parts" Watch Machines Work at Sylvania. E. J. Tangerman and George H. DeGroat. *American Machinist,* v. 96, Sept. 15, 1952, p. 113-136.

Editors visited three Sylvania Electric Products plants, two in Warren, Pa., and one in Emporium, Pa. Ideas in wire plating, drawing, and welding; annealing; steel-sheet carbonizing and slitting; pin rolling; plastics molding; assembly; and metal parts manufacture.
(G general, F28, J general)

463-G. Soft Steel and Ultrasonics Machine Carbide. George H. DeGroat. *American Machinist,* v. 96, Sept. 15, 1952, p. 141-144.

Hard and brittle metals, as well as nonmetals, are quickly and easily machined using the ultrasonic process. Soft tools, with boron carbide as an abrasive, drill and thread holes, produce complex cavities and recesses of any depth and shape in carbides, hardened tool-steel, ceramics, glass, and other materials, conducting and nonconducting alike.
(G17, C-n, TS)

464-G. Make Research Data Useful to the Shop Man. Max Kronenberg. *American Machinist,* v. 96, Sept. 15, 1952, p. 145-150.

Productivity in metal-cutting operations. Use of available charts for SAE 1035 steel and for brass, illustrated by numerical examples. Points out need for similar research to be done on many other materials.
(G17)

465-G. Cartridge Cases Are Drawn From Hot-Forged Cups. George H. DeGroat. *American Machinist,* v. 96, Sept. 15, 1952, p. 151-152.

Operation as applied by Frankford Arsenal to production of 75-mm. cases from SAE 1030 hot rolled steel bar stock. Only three basic operations are required—sawing bar stock, heating bars, and forging. Important advantages. (G4, CN)

466-G. Labor Is the Big Factor in Friction-Sawing Costs. *American Machinist,* v. 96, Sept. 15, 1952, p. 153.

A recent item described use of ordinary box strapping as a toothless band-blade for friction-sawing stainless steels and other ferrous alloys. However, although box strapping costs only 3 cents per shift as compared with $12 per shift for regular saw blades, labor costs make actual costs four to six times higher for the makeshift material.
(G17, Fe, SS)

467-G. Soviet Machine Tools. J. Mannin. *Engineers Digest,* v. 13, Aug. 1952, p. 253-256.

History of machine tools in Russia, equipment produced in Russia, features and design, technical advancement in techniques and mechanical equipment, and statistical review of production and use of machine tools and allied equipment.
(To be continued.) (G17)

468-G. Cutting Fluids for Machine Tools. C. M. Larson. *Petroleum Engineer,* v. 24, Sept. 1952, p. C5-C8, C10, C13-C14, C16, C18.

Cooling, wetting properties, lubrication, chip removal, types of fluids, cutting oils, and cutting fluid ingredients. Cutting fluid recommendations for high speed steel, cobalt alloys, and cemented carbide tools. Photographs and tables.
(G21, TS, Co, C-n, SG-j)

469-G. Plastic Dies Draw Truck Panels. H. C. Tuttle. *Steel,* v. 131, Sept. 15, 1952, p. 92-93.

Application of a standard aircraft-parts procedure to drawing operation at Chrysler Corp.'s Detroit plant. Advantages are time-saving, lighter weight, and lower cost.
(G4, CN)

470-G. (German.) Fundamentals of the Effect of Temperature and Abrasion in Machining, Especially of Creep Resisting and Stainless Steels. H. Opitz. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

The processes involved in continuous formation of shavings from point of view of plasticity mechanics. Proposes a method for the calculation of temperature accompanying shearing process. The special problems of C steels and austenitic steels. Graphs and diagrams.
(G17, SS, CN, AY, SG-h)

H

POWDER METALLURGY

100-H. Powder Metallurgy Parts in High Temperature Applications. Julius J. Harwood. *Materials & Methods,* v. 36, Aug. 1952, p. 87-91.

Development and use of Cu-infiltrated iron, Ti alloy powders, sintered Al powder, Mo-base alloys, and "cermets." Shortages and service limitations of present high-temperature alloys are hastening their development. Tables and graphs show mechanical and oxidation characteristics. 10 ref.
(H general, Q general, R2, Cu, Ti, Fe, Al, Mo, SG-h)

101-H. (French.) "S.A.P.", a New Material Made From Aluminum Powder Sintered Hot. A. von Zeerleder. *Metaux: Corrosion—Industries,* v. 27, June 1952, p. 274-277.

SAP (sintered aluminum powder), its fabrication, applications, and mechanical properties, the latter being compared with those of "Alloy Y", Avional, and pure Al. Graphs and tables.
(H general, Q general, Al)

102-H. (German.) Powder-Metallurgical Production of Semi-Finished Products From Nonferrous Metals. H. Franssen. *Metall,* v. 6, Aug. 1952, p. 444-446.

Various processes; advantages of the nonferrous metals over Fe for many purposes. (H general, EG-a)

103-H. (German.) Impregnated Iron-Copper Materials. A. Vidmajer. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften,* v. 83, No. 3, 1952, p. 664-677.

These materials are intermediate in properties between alloys and mixtures with properties usually different from and superior to those of its components. Preparation of porous Fe compacts and their impregnation with Cu. Rupture strength, hardness, and electrical properties of compacts, porous sintered bodies, and impregnated bodies are compared.
(H16, Q23, Q29, P15, Fe, Cu)

104-H. (German.) Trends in the Design and Use of Sintered-Iron Friction Bearings. Werner Schroeder. *Technik,* v. 3, Apr. 1952, p. 181-188.

Production and properties of sintered iron. Production machining, designing, operating conditions, lubrication, tolerances, and possible uses of the bearings. Diagrams, tables, and graphs. 19 ref.
(H general, T7, Fe)

105-H. Ingenious Tools Make Complex Metal-Powder Parts. *American Machinist,* v. 96, Sept. 1, 1952, p. 105-109.

Pressing tools, and sizing equipment for holding close tolerances. Diagrams and photographs show typical pieces produced by Michigan Powdered Metal Products Co., Northville, Mich. (H14)

106-H. Diffusion in Sintering. Pol Duwez. *American Society for Metals* "Atom Movements", 1951, p. 192-208.

The part played by diffusion in sintering, and the sintering process as a whole. A one-component system (case of a pure metal), and multicomponent systems (several metals) in which alloying takes place as an additional process. Literature data on Cu, Fe, Zn, and Au. Diagrams and graphs. 22 ref.
(H15, N1, Cu, Fe, Zn, Au)

107-H. A High Temperature Sintering Furnace. J. H. Rendall. *Journal of Scientific Instruments,* v. 29, Aug. 1952, p. 248-250.

A laboratory furnace which can heat refractory metals very efficiently. It can be heated to or cooled from high temperature in less than 10 min. and the specimen can be lowered into or raised from the hot zone while the furnace is at temperature. As the furnace contains no refractory materials to absorb heat, it rapidly attains the equilibrium temperature corresponding to a particular power input. Diagrams.
(H15, SG-h)

108-H. Sintered Aluminum Powder: The Development of SAP. *Metal Industry,* v. 81, Aug. 22, 1952, p. 143-146.

Advantages of German development, giving tabulated information on physical and mechanical properties of the powder and the sintered products. (H general, Al)

109-H. Pressure Conditions in Metal Powders During Pressing Procedure. C. Ballhausen. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

A principle of conformity exists between the behavior of a metallic powder being pressed in a mold and the behavior of a rope moving on a pulley, except that in one case pressure and in the other case tension must be applied. Experimental data on Pb, Cu, Fe, and steel. Diagrams, photographs, and graphs.
(H14, Pb, Cu, Fe, ST)

110-H. Grain Formation in Hard Metal Alloys. Walther Dawihl. *Microtecnic* (English Ed.), v. 6, Sept. 1952, p. 165-173. (Translated from the German.)

Occurrence and influence of intermediate layers on grain formation in sintered alloys of WC in combination with Co, and with Ni. 11 ref.
(H15, Co, Ni, W, C-n)

111-H. (German.) Activity of Finely Grained Powder and Its Influence on the Sintering Process. J. Hinnüber and O. Rüdiger. 4th International Mechanical Engineering Congress, June 1952, 22 pages.

How the activity of a finely-grained powder can be measured by a number of methods. Sintering process and properties of sintered products depend on condition of the powder used. Measurements made with four different tungsten powders. Mechanical properties of hard metal alloys. Electron-microscope data on primary particles and recrystallized grains in tungsten carbide-cobalt-alloys. Graphs, tables, photographs, micrographs. 15 ref.
(H11, H15, Q general, W, C-n, Co, SG-m)

112-H. (German.) Rolling of Metal Powders. Gerhard Naeser. 4th International Mechanical Engineering Congress, June 1952, 14 pages.

Introduction of metal powders into the gap of rolls arranged adjacent to each other results in an endless strip which by repeated short sintering and cold and hot rolling will attain the properties of strip as made by the usual process. Effect of rolling factors on density and strength of the compressed strip; determination of sintering times and of change occurring in strength with the number of cold-rolling passes; and manufacture of Fe, Cu, and brass strips and determination of their characteristics. Diagrams, graphs, and tables. (H14, F23, Fe, Cu)

113-H. Friction Materials. K. G. Thafvelin. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Manufacture and treatment of materials composed of metal powder mixed with powdered nonmetallics; desired properties; choice of materials; and service. Photographs and graph. (H general, T7, SG-c)

114-H. Reactions During Sintering of a Zirconium Carbide-Niobium Cermet. W. G. Lidman and H. J. Hamjian. *Journal of the American Ceramic Society*, v. 35, Sept. 1952, p. 236-240.

A zirconium carbide-columbium cermet sintered under pressure was investigated. Effect of the variables, sintering temperature, and time at temperature, on the crystallographic structures was examined by back-reflection x-ray diffraction. (H15, M26, Zr, Cb, C-n)

115-H. The Application of Sintered Iron and Steel Parts in the Mechanical Industry. S. I. Hulthén. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

Powder production and economics; advantages and disadvantages of powder metallurgy as a production method; chief steps in the process; and application and economy. (H general, Fe, ST)

116-H. (French.) Some Porous Materials Obtained by Sintering Without Pressure. Maurice Claude. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 172.

By using welding fluxes such as borax, and operating under atmospheric pressure, at temperatures higher than the melting point of the material being tested, it was possible to obtain sintered metal bodies of desired porosity for different applications. (H15)

117-H. (Portuguese.) Effect of Particle Size on Certain Properties of Sintered-Iron Products. Carlos de Revorédo Barros. *Boletim da Associacao Brasileira de Metais*, v. 8, Jan. 1952, p. 32-47.

The necessity of checking the raw material used in the powder metallurgy industry was investigated, in order to obtain uniformity of the final product. Influence of particle size on certain physical properties of sponge and electrolytic Fe powder was investigated. Table, graphs, and photomicrographs. (H11, Fe)

J

HEAT TREATMENT

227-J. Kidde Boosts Cylinder Production With Automatic Heat Treating Equipment. V. J. Hill. *Industrial Heating*, v. 19, Aug. 1952, p. 1390-1392, 1394, 1396, 1398.

Equipment and procedures of Walter Kidde & Co., Belleville, N. J., for production of steel cylinders for compressed gases, etc. Diagram and illustrations. (J general, ST)

228-J. Axle Shaft Flanges Annealed in Liquid Bath Furnaces. John Kremer. *Industrial Heating*, v. 19, Aug. 1952, p. 1400, 1402, 1404, 1536.

Equipment and procedures of Eaton Mfg. Co.'s Axle Div., Cleveland. Materials are alloy steels of the 4100 and 4300 series. (J23, AY)

229-J. Electric Furnace Company Expands Research Facilities. C. L. West. *Industrial Heating*, v. 19, Aug. 1952, p. 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1536.

Previously abstracted from *Steel Processing*. See item 219-J, 1952. (J general)

230-J. Annealing for Narrow Strip Mills. J. L. Whitten. *Iron and Steel Engineer*, v. 29, Aug. 1952, p. 84-90; disc. p. 90-91.

Shows how extensively the narrow strip industry has adopted the most modern conception of annealing design in single-stack furnaces with high convection gas-circulating systems, high heat inputs, alloy inner covers, and oil-sealed bases. Diagrams and illustrations. (J23, ST)

231-J. Decarburization. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 2, 1952, p. 110-111, 113-114.

The loss of carbon from the surface of a steel or steel part, which occurs when it is heated in an oxidizing atmosphere, and results in reduced hardness of the surface. Causes and means of minimization. (J28, ST)

232-J. One Way to Increase Heat Treating Furnace Efficiency. Frank Panlener. *Materials & Methods*, v. 36, Aug. 1952, p. 106-107.

By redesign of fixtures, Heat Treating Dept., Nash Motors Div., reduced dead weight and increased effective capacity of a gas carburizing furnace without overloading it. (J28)

233-J. (German.) Structure and Hardenability of Copper-Manganese-Silicon Alloys. K. L. Dreyer. *Metall*, v. 6, Aug. 1952, p. 440-444.

The behavior of Cu-Mn-Si alloys on the basis of the literature. Experiments with alloys containing 1 and 2% Mn, and 2-5% Si. (J26, M27, Cu)

234-J. Mechanism of the Carburization of Some Stainless Steels. J. B. Giacobbe. *American Society for Metals*, Preprint 3, 1952, 15 pages.

A theory of carburization of alloy steels postulates that pure, solid carbon cannot supply soluble or diffusible carbon to the metal surface. An "oxidizing potential" created by CO_2 or water vapor must exist in order that nascent carbon may be generated as a result of the formation and subsequent dissociation of CO. It is shown that certain 18-8 austenitic stainless steels can absorb carbon from high-purity graphite under a vacuum of the order of 10^{-4} mm Hg. Under these conditions, it is believed that the gaseous phase or "oxidizing potential" plays a minor role in the mechanism of carburization. On the other hand, contact pressure between the solid carburizer and the metal surface exerts a pronounced influence on rate of carburization; the higher the pressure, the greater the C absorption. This is explained on the basis of "contact catalysis." (J28, SS)

235-J. The Effect of Silicon on the Tempering of Martensite. A. G. Allten and P. Payson. *American Society for Metals*, Preprint 10, 1952, 28 pages.

Evidence that Si affects hardness during tempering of 0.6% C and 0.4% C+3% Ni steels which contained up to 2.2% Si. Hardness, dilatometric, specific volume, electrical resistivity, and X-ray diffraction measurements were used. Results demonstrate that the temperature at which cementite forms, on heating of martensite at a definite rate, is raised in relation to Si content. Notch-impact properties of the tempered steels were affected by the presence of Si. 13 ref. (J1, Q6, N8, CN, AY)

236-J. The Mechanism and Kinetics of the First Stage of Tempering. C. S. Roberts, B. L. Averbach, and Morris Cohen. *American Society for Metals*, Preprint 11, 1952, 24 pages.

Studied by means of X-ray and length measurements on a series of high purity Fe-C alloys and commercial steels. A single-crystal X-ray technique was employed to ascertain changes in the martensitic matrix attending rejection of carbon. Kinetics of the retained austenite transformation in the 2d stage of tempering are reported in an appendix. (J1, N8, Fe, ST)

237-J. An End-Quench Test for Determining the Hardenability of Carburized Steels. F. X. Kayser, R. F. Thomson, and A. L. Boegehold. *American Society for Metals*, Preprint 13, 1952, 17 pages.

A new type of end-quench bar developed specifically for measuring the hardenability of case treated steels is called the trapezoidal bar. It was designed so that hardness impressions can be made at any point in the case or in the core over the entire quenched length of the bar without the necessity of grinding. Hardness impressions are made perpendicular to the concentration gradient, and hardenability results are directly comparable to those obtained by using a standard Jominy bar. Data from experimental work in measuring hardenability of grades of carburizing steels indicate that case hardenability of boron steels goes through a maximum at about 0.70% C. (J26, Cn, AY)

238-J. The Influence of Boron on Case Hardenability in Alloy Carburizing Steels. C. F. Jatczak and E. S. Rowland. *American Society for Metals*, Preprint 14, 1952, 13 pages.

The carburized end-quench test was used to evaluate the effect of boron on case hardenability of 80B20, 94V20, 94B20, and 47B20 containing 0.60-1.0% C for several heat treating conditions. (J28, AY)

239-J. Effect of Carbon Content on 18-4-1 High Speed Steel. Arthur H. Grobe and George A. Roberts. *American Society for Metals*, Preprint 15, 1952, 17 pages.

Complete hardness data, for hardening and tempering, are reported for five 18-4-1 high speed steels with C contents varying from 0.52 to 0.78% and one steel with 0.57% C and 1.21% V. The steels were austenitized for 0.1-300 min. at 1800-2350° F. Data on effect of austenitizing time and temperature on oil quenched hardness are presented as iso-hardness lines on time-temperature plots for each steel. Tempering data are recorded as master tempering curves where hardness is plotted against tempering parameter for each austenitizing temperature for every steel. Unnotched Izod impact tests were made using five steels oil quenched from 2200° F. and three steels from 2350° F. (J22, Q29, TS)

240-J. The Effect of Quenching and Tempering on Residual Stresses in Manganese Oil Hardening Tool Steel. Harold Jack Snyder. *American Society for Metals*, Preprint 21, 1952, 12 pages.

Data indicate that the principal quenching stresses in a fully hard-

ened flat specimen are tensile, equal in all surface directions, and concentrated within a surface layer 0.025 in. thick. A tempering treatment progressively decreases these surface stresses until they become negligible or slightly compressive, but does not affect depth of penetration. Effects of etching, lapping, and grinding on residual stresses in the same steel were also investigated. 17 ref. (J29, Q25, TS)

241-J. What Temper Is Best for Insulated Aluminum Conductors? Joel Tompkins. *Electrical World,* v. 138, Sept. 8, 1952, p. 120-122.

Heat-cycle tests at Electrical Conductor Laboratory of Aluminum Co. of America show advantages of intermediate temper for best over-all "connectibility" characteristics for insulated Al wire and cable. (J27, T1, Al)

242-J. Equipment for the Thermal Treatment of Non-Ferrous Metals and Alloys. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 667-681.

Joint discussion of seven papers published in v. 80, p. 255-339. See items 77-5 through 83-J, 1952. (J general, EG-a)

243-J. What Price Hardenability? Harry M. McQuaid. *Metal Progress,* v. 62, Sept. 1952, p. 88-96.

Considers various types of alloy steel with respect to hardenability, and application in automotive parts. Advantages of Cr-V steels, use of straight Cr steel, economic criteria for use of Cr and Mn, and increased use of Mo in alloy steels. (J26, T21, AY)

244-J. Use Care in Heat Treating Austenitic Alloys. *Steel Processing,* v. 38, Aug. 1952, p. 387.

Metallurgical research at laboratories of the Superior Tube Co., has reaffirmed the re-emphasized five major danger areas which must be watched during the heat treating of austenitic stainless steels. (J general, SS)

245-J. (French.) **Improvements and Saving of Steels in Quench Hardening.** Manlio Pesante. 4th International Mechanical Engineering Congress, June 1952, 23 pages.

The quenching phenomenon; its effect on steel structural changes; and the so-called cooling power of quenching baths. Conditions to be fulfilled by the bath. An instrument which automatically records the quenching curve while quenching progresses. Graph characterizes cooling power of the bath. (J2, J26, ST)

246-J. (French.) **A Furnace for the Stabilization of Castings.** Georges Ulmer. *Fonderie,* July 1952, p. 2999-3006.

Furnace used for stress-relief annealing of castings. Dimensions, construction, and operation. Results of experiments. (J1)

247-J. (German.) **Influence of Annealing and of Nitrogen on Properties of Electric Arc Welds.** Fr. Gentner. *Brennstoff-Wärme-Kraft,* v. 4, Aug. 1952, p. 275-279.

Welds in boiler construction. Compares the properties of unannealed welds with those annealed without stresses and with air-quenched welds. Proposes an explanation for the differences noted. (J23, K1, ST)

248-J. Toolroom Heat-Treating Equipment. *American Machinist,* v. 96, Sept. 15, 1952, p. 169, 171, 173.

A condensed description of various types. Includes rating chart for toolroom furnaces. (J general)

249-J. Electrode Salt Baths. *Iron & Steel,* v. 25, Sept. 1952, p. 413-415.

Production and toolroom models of salt baths, used for various heat treatment processes. (J2)

250-J. Heat Treating Austenitic Alloys. *Screw Machine Engineering,* v. 13, Sept. 1952, p. 63.

Recommendations for Series 300 stainless steels. (J general, SS)

K

JOINING

671-K. Flash Welding of Titanium Alloys. I. A. Oehler. *Automotive Industries,* v. 107, Aug. 15, 1952, p. 39, 154, 156.

See abstract of "Titanium Alloys Flash Welded Easily," *Steel;* item 597-K, 1952. (K3, Ti)

672-K. Special Welding Equipment Used at Nash Body Plant. Joseph Geschlein. *Automotive Industries,* v. 107, Aug. 15, 1952, p. 50-53.

Welding and spray-paint equipment. (K general, L26, CN)

673-K. Preheat Temperatures for Welding Metals and Alloys. *Materials & Methods,* v. 36, Aug. 1952, p. 131.

Tabular presentation confined to the various types of steel. (K1, ST)

674-K. Ultrasonic Soldering. E. A. Neppiras. *Metal Industry,* v. 81, Aug. 8, 1952, p. 103-106.

A practical method of soft soldering Al and its alloys. Advantages and limitations. 16 ref. (K7, Al)

675-K. Secondhand Rails for New Yard. *Railway Engineering and Maintenance,* v. 48, Aug. 1952, p. 760-761.

How Central of Pennsylvania is pressure-welding second-hand rails into double or multiple lengths and sawing the latter into 78 or 75-ft. pieces. Photographs. (K2, G17, CN)

676-K. Welding in Connection With Various Tunnelling Works. E. R. Bidder. *Transactions of the Institute of Welding,* v. 15, Apr. 1952, p. 43-47.

Concerned with welding rather than tunnelling welded steel construction in relation to the type of tunnel having a circular section and a cast iron lining. (K general, CN)

677-K. Welding in the Construction of Hydro-Electric Plant. J. Crawford. *Transactions of the Institute of Welding,* v. 15, Apr. 1952, p. 48-53.

Equipment and procedures of British firm. (K general, CN)

678-K. Automatic Welding. J. Latimer. *Transactions of the Institute of Welding,* v. 15, June 1952, p. 71-82; disc., p. 82-85.

The principal types of automatic welding machines now in use, comparing their relative merits and drawbacks. Examination of certain applications to which hand welding might appear to have an advantage. Length of run, size of joint, speed of actual welding, and economy of electrodes are not the only important factors favoring more extensive use of automatic welding. (K1)

679-K. Welding of Heat-Resistant Steels. H. F. Tremlett. *Welding and Metal Fabrication,* v. 20, July 1952, p. 258-261; Aug. 1952, p. 299-303.

Various aspects of heat resistant steels as they affect the engineer. 1025—M.R. . . 7on7 . . Sept. 18 . . GUS Resistance to scaling and the effect of alloying elements such as Cr, Ni, and Ti upon the scaling resistance, strength at temperature, and creep resistance. Tables and graphs. (K general, R2, Q3, SG-h, SS)

680-K. Correlation of Weldability Tests With Structural Joints. Part II. Investigations With Unrestrained Fillet Tests and Structural Joints. C. L. M. Cottrell and M. D. Jackson. *Welding Research,* v. 6, Apr. 1952, p. 31r-42r.

Relative effects of joint rigidity and rate of cooling on initiation of hard-zone cracking were studied in an attempt to resolve the two effects, and to provide a scientific basis for correlation of weldability tests and structural joints. Effect of potential hydrogen content in the electrode coating on incidence of hard-zone cracking was also studied. Low-alloy Mn-Mo steels were used in the tests. Results are tabulated, charted, and illustrated. (K9, AY)

681-K. Weld Hardenability of Chromium-Molybdenum Steel Pipe. *Welding Research,* v. 6, Apr. 1952, p. 43r-46r.

Metal-arc welded samples of 1% Cr, 0.5% Mo steel pipe differing in wall thickness were provided by three different firms, using various sizes of electrode and preheating temperature. The lowest hardness in the heat-affected zone was associated with the highest temperature of preheat (300° C.); and the results obtained indicate that a preheating temperature of not less than 200° C. should be used when welding these steels. (K9, J26, AY)

682-K. (Italian.) **Light-Alloy Rivets.** *Alluminio,* v. 21, June 1952, p. 291-315.

Mechanical characteristics of principal light alloys used in rivets, determination of diameter and length of the rivets as a function of thickness of the part to be riveted, types of riveting machines, distribution of rivets and their distance from edge of plate, and riveting defects. Drawings, tables, and photographs. 15 ref. (K13, T5, Al)

683-K. (Spanish.) **Completely Welded Ship Hulls. Practical Consequences of the Results Obtained During Their Construction and Maintenance. Part II.** Erich Vollbrecht. *Ciencia y Técnica de la Soldadura,* v. 2, Mar.-Apr. 1952, 9 pages.

Order and sequence of construction, as well as difficulties encountered and their solution. Correction of deformations and relief of welding stresses. (K1, T22, CN)

684-K. (Spanish.) **Four Workshop Tests for Investigating the Quality of Electrodes for Electric Welding.** Jose Izaguirre Cobo. *Ciencia y Técnica de la Soldadura,* v. 2, Mar.-Apr. 1952, 10 pages.

Operation, yield, texture, and cracking tests. (K1)

685-K. (Spanish.) **Basic Electrodes.** Salvador Ma. Checa Casajus. *Ciencia y Técnica de la Soldadura,* v. 2, Mar.-Apr. 1952, 8 pages.

Advantages and disadvantages of basic coated electrodes. Compares the mechanical and penetration characteristics of basic electrodes with other kinds of electrodes, stressing the great advantages of the former and their future possibilities. Photographs and tables. 17 ref. (K1)

686-K. (Spanish.) **Revision of the Theory of Weldability.** Felipe A. Calvo Calvo. *Ciencia y Técnica de la Soldadura,* v. 2, Mar.-Apr. 1952, 8 pages.

Discussion on the basis of theory and experiment. (K9)

687-K. Flash Welding Titanium Alloys. I. A. Oehler. *Light Metal Age,* v. 10, Aug. 1952, p. 12-13.

See abstract of "Titanium Alloys Flash Welded Easily", *Steel;* item 597-K, 1952. (K3, Ti)

688-K. Redux for Spars. *Aeroplane,* v. 83, Aug. 15, 1952, p. 216-218.

Application of Redux bonding process to composite spar-boom construction. Comparison of compression strength of riveted and Redux bonded booms. Photographs and tables. (K12, Al)

689-K. The Applicability of Fusion Welding to Pipe Fabrication. J. W. Atherton. *Australasian Engineer,* July 7, 1952, p. 54-57.

Use of metal-arc welding in piping installations where high pressures and temperatures are involved. (K1, ST, CN, AY)

690-K. New Welding Process Developed for Joining Small Aluminum Wires. P. B. Dickerson and C. R. Dixon. *Automotive Industries,* v. 107, Sept. 1, 1952, p. 50-51, 100, 102.

Welded joints are easy to make with simplified equipment, and have excellent corrosion resistance. Al was welded experimentally to brass, nichrome, chromel, alumel, W, steel, Fe, and constantan. (K6, Al, Cu, Ni, ST, Fe, W)

691-K. The Job That Needed New Welding Procedures. D. L. Rigsby and M. J. Waite. *Canadian Metals,* v. 15, Aug. 1952, p. 50, 52, 54.

A single "V" welding method used to repair a cracked cast-steel main-cylinder wall of a 4,000-ton extrusion press. (K1, CI)

692-K. High-Strength Bolts—a New Concept in Structural Connections. T. R. Higgins and E. J. Ruble. *Civil Engineering,* v. 22, Sept. 1952, p. 176-179, 255.

Pros and cons of use of bolts in preference to rivets in certain phases of metal construction. (K13)

693-K. Sequence and Continuity Mark Modern Welding Practice. R. W. Binder. *Civil Engineering,* v. 22, Sept. 1952, p. 186-191.

Practices used in the Division Street Interchange, San Francisco. (K general, CN)

694-K. California's All-Welded Viaduct Points Way to Improved Design. L. C. Hollister. *Civil Engineering,* v. 22, Sept. 1952, p. 180-185, 238. (K general, T4, CN)

695-K. Welded Machine Tools. O. Bondy. *Engineers Digest,* v. 13, Aug. 1952, p. 263-266.

By replacing heavy castings with fabricated steel of appropriate design, considerable amount of weight can be saved. Photographs show machinery of all-welded construction. 14 ref. (K general, T5, ST)

696-K. Technique for Welding Stainless Pressure Vessel. James Joseph. *Industry & Welding,* v. 25, Sept. 1952, p. 40-42, 91.

Fabrication of a high-strength pressure vessel, designed to contain 200 gal. of liquid N_2 at 5500 psi. and at −340° F. with comfortable safety tolerances. Emphasis placed on welding. Includes flame cutting, forging, and heat treatment. (K1, G22, F22, J general, SS)

697-K. Iron Powder Backup Material for Efficient Welded Joints. *Industry & Welding,* v. 25, Sept. 1952, p. 60-62, 108-109.

Previously abstracted from "Get Better Welds With Iron Powder Backup." H. Hauttman. *Iron Age,* item 413-K, 1952. (K general, H general, CN)

698-K. Canada's Largest Fractionating Tower Demonstrates Strength and Economy of Welded Construction. *Industry & Welding,* v. 25, Sept. 1952, p. 66-68, 70-72.

Fabrication from stainless-clad plate, carbon steel plate, and Type 416 stainless steel. Includes handling, heat treatment, and transportation. (K1, J general, SS, CN)

699-K. Welded Doors and Windows. Howard E. Jackson. *Industry & Welding,* v. 25, Sept. 1952, p. 74, 77-78.

Procedures at Steel Products, Inc., Seattle, arc welding, spot welding, and combination of both are used. (K1, K3, CN)

700-K. Use of Stud Welding Boosts Boiler Production 25 Percent. *Industry & Welding,* v. 25, Sept. 1952, p. 80-81. (K1, CN)

701-K. Change in Welding Procedure Speeds Fabrication of Ship Beams. Bernard Smolka. *Industry & Welding,* v. 25, Sept. 1952, p. 84-85, 93.

Results of 14 tests to secure the fastest and most efficient procedure for welding gussets into place on ship decks. (K9, CN)

702-K. More About Efficient Cable Connections (Mechanical). *Industry & Welding,* v. 25, Sept. 1952, p. 87-89.

Report on a new tool which is said to produce mechanical cable and lug connections of high electrical efficiency. Photographs show process. (K13, T1, Cu)

703-K. Explosion Transition of Weldments. *Metal Progress,* v. 62, Sept. 1952, p. 162, 164, 166, 168. (Condensed from "Investigation of Factors Which Determine the Performance of Weldments", C. E. Hartbower and W. S. Pellini, *Welding Journal).*

Previously abstracted from original. See item 621-K, 1951. (K9, Q26, ST)

704-K. Solders and Soldering. *Metal Progress,* v. 62, Sept. 1952, p. 179. (Condensed from "Solders and Soldering: Some Recent Advances", H. C. Watkins, *Metallurgia).*

Previously abstracted from original. See item 108-K, 1951. (K7)

705-K. Flash Welding Titanium. I. A. Oehler. *Modern Metals,* v. 8, Aug. 1952, p. 39.

See abstract of "Titanium Alloys Flash Welded Easily," *Steel,* item 597-K, 1952. (K3, Ti)

706-K. Engine Blocks: Sandwiched From Simple Castings. *Steel,* v. 131, Sept. 1, 1952, p. 88-89.

Complicated castings can be broken down into simple components, then furnace brazed to form the finished part. Use of the method on Al engine blocks is said to be promising. (K8, Al)

707-K. Saved: 341 Tons of Steel. I. R. A. Phelps. *Welding Engineer,* v. 37, Sept. 1952, p. 23-26.

Savings at the V. A. Hospital in Minneapolis by welding rather than riveting the steel structure. (K general, T26, CN)

708-K. Tips for Longer Tube Life. Thomas A. Dickinson. *Welding Engineer,* v. 37, Sept. 1952, p. 40-41, 46.

Factors affecting electronic tubes and possible remedies. Welding operations in their fabrication. (K general, T1)

709-K. Hot "Sandwich" of Copper and Stainless. *Welding Engineer,* v. 37, Sept. 1952, p. 42-43.

Ways in which "Rosslyn Metal" can be welded with reference to spot, seam, and arc welding. Strength at high temperature. (K3, K1, Q23, SS, Cu)

710-K. Complex Technique Used for Stainless Nacelle Production. *Western Metals,* v. 10, Aug. 1952, p. 37.

Use of AISI Type 301 stainless steel in production of aircraft nacelles at Solar Aircraft Co., San Diego. Almost 20,000 individual spotwelds are required per unit. (K3, SS)

711-K. (German.) Calculation and Construction of Welded Structures. Influence of Size and Strength in Resistance Spot Welding. W. Glage. *Schweissen und Schneiden,* v. 4, Aug. 1952, p. 292-297.

Proposes a method of calculation on the basis of data from the literature. Examples. Data are tabulated and charted. (K3, CN)

712-K. (German.) Production of a Motor Housing by Means of Welded Construction. Raimund Pertusini. *Schweisstechnik,* v. 6, July 1952, p. 73-75.

Advantages of welded parts over cast parts. Details of construction are diagrammed. (K general, CN)

713-K. (Japanese.) Welding Mechanism of Resistance Welding and Determination of Welding Procedures. Zenzaburo Sawai. *Report of the Institute of Industrial Science, University of Tokyo,* v. 1, no. 7, Mar. 1951, p. 208-238.

Electrical, thermal, and mechanical problems of resistance welding, such as heating due to contact. resistance, effect of mechanical pressure, and cooling by surrounding metals and electrodes, are discussed from an experimental and theoretical standpoint. A method of determining welding procedure. Slope control of welding current is very effective in some cases. Graphs and diagrams. 25 ref. (K3)

714-K. Electric Arc Welding of Magnesium Alloys. K. K. Khrenoff, M. N. Gapchenko, and G. P. Sakhatzky. *Aircraft Engineering,* v. 24, Sept. 1952, p. 277-278. (Translated from *Avtogennoe Delo,* Aug. 1951, p. 1-5.)

Tests on the carbon-arc welding of corrosion resisting Mg alloy. Recommended practice covers use of fluxes, welding procedures and welding conditions, and preparation and positioning of components. Tables. (K1, Mg)

715-K. Production-Line Soldering and Brazing. C. E. Eadon-Clarke. *Electrical Communication,* v. 29, Sept. 1952, p. 179-185.

See abstract of "Push-Button" Soldering and Brazing; *Welding and Metal Fabrication;* item 451-K, 1951. (K7, K8)

716-K. Ethoxyline Resins as Cast Resins and Bonding Agents for Metals. Karl Frey. 4th International Mechanical Engineering Congress, June 1952, 13 pages.

Examples illustrate the manifold technical possibilities of adopting these resins. Tabulated properties. (K12)

717-K. (French.) Study Using the Crossed-Gradient Method of the Behavior of Steel During Welding. Henri Granjon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, July 16, 1952, p. 173-175.

Method of studying general metallographic problems when it is necessary to associate three variables: duration of heating, maximum temperature, and rate of cooling. (K9, M23, ST)

718-K. (French and German.) Experiences With Brazed Joints. Edw. Demuth, Jr. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 42, Aug. 1952, p. 155-160.

Construction details of the application of Cu fittings to water, gas, and oil ducts. Photographs. (K8, Cu)

719-K. (Book.) Structural Theory and Design. Vol. II. J. McHardy Young. 310 pages. 1951. Crosby Lockwood & Son Ltd., 39 Thurloe Street, London S.W. 7, England. $4.00.

Advanced theory and design suitable for the specializing student and for the practicing structural engineer. Various structures; foundations; earth pressures, etc.; and structural connections including riveted, bolted, and welded, for steelwork. Photographs, diagrams, tables, and chapter bibliographies and exercises. (K general, T26, ST)

720-K. (Pamphlet.) Welding, Joining and Cutting of Gray Iron. C. O. Burgess. 1951. 37 pages. *Gray Iron Founder's Society,* 210 National City-E. 6th Bldg., Cleveland 14, Ohio. $1.50.

New processes and techniques; how the advantages of welded fabrication can be extended to gray-iron components. Engineering considerations in using welding processes. General considerations in welding gray iron, arc welding processes, brazing, special joining processes, and torch and arc cutting. (K general, G22, CI)

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CLEANING, COATING AND FINISHING

793-L. Metal-Ceramic Composites. J. H. Westbrook. *American Ceramic Society Bulletin,* v. 31, June 1952, p. 205-208; July 1952, p. 248-250.

Reviews the general field of metal-ceramic materials with respect to their history, applications, forms, properties, manufacture, and design. Underlying problems involved in fabrication and application are analyzed and lack of basic data for many common chemical and physical properties is emphasized. Part II: Design, fundamental problems, basic data required, equipment, and the present status. 107 ref. (L27, H general)

794-L. Long-Time Performance of Pipeline Coatings. Guy Corfield and C. W. Shupp. *American Gas Association, Proceedings,* v. 33, 1951, p. 439-447.

Nonmetallic coatings for underground pipe. Performance tests and specifications developed to maintain or improve the quality. Present quality control procedures and installation practices. Tabular data. (L26)

795-L. The Use of Barium Peroxide for Extending the Life of a Nickel Bath. Jason M. Zander. *Better Enameling,* v. 23, Aug. 1952, p. 6-7, 32.

A typical example of the over-all shop results obtained with respect to daily changes in pH and ferrous sulfate content affected by barium peroxide additions is shown in a table. Results cover a period of two months continuous operation, during which time approximately 450,000 sq. ft. of ware were processed in an 1800-gal. tank. (L27, Ni)

796-L. Anodic Oxidation and Colouring of Aluminium. Bernard C. Lewsey. *Electroplating and Metal Finishing,* v. 5, Aug. 1952, p. 250-253.

Aluminum anodized in chromic acid electrolyte by a modification of the Bengough process can be satisfactorily dyed to both pastel and deep colors and to black. In comparison with the finish produced by the normal H_2SO_4 process, the chromic acid finish appears much more solid and more closely resembles enamel or high-gloss paint. Experiences with this process on a production basis. (L19, Al)

797-L. Outplating at the Ionic Plating Company Ltd. *Electroplating and Metal Finishing,* v. 5, Aug. 1952, p. 254-258.

British job shop. Equipment used. (L17)

798-L. Tri and Perchlorethylene; Some Notes on Their Stability and Applications. *Electroplating and Metal Finishing,* v. 5, Aug. 1952, p. 259-260.

As metal-degreasing agents. (L12)

799-L. Metal Spraying on Hydro-Electric Plant; a Successful Application to the Pangani Falls Pipe Lines. J. F. Attwell. *Electroplating and Metal Finishing,* v. 5, *(Metal Spraying,* v. 2), Aug. 1952, p. 279, 281-282.

Equipment and procedures for sand-blasting and spray coating of interior of steel pipelines for water supply, located in Africa. (L10, L26, ST, Al)

800-L. Great Improvements in Finishing of Steel Furniture of Simmons Factory in Kenosha, Wisconsin. *Furniture Manufacturer,* v. 73, Aug. 1952, p. 12, 14-16, 59.

Equipment and procedures. (L general, ST)

801-L. Screen Process Printing of Formed Metal Parts. Stephan Andrews. *Industrial Finishing,* v. 28, Aug. 1952, p. 64-66, 71-72, 74.

Procedures and equipment of Stewart-Warner Corp., for printing identifying markings on radar chassis. Presence of flanges on the sheet metal make the process unusually difficult. (L26)

802-L. Far Infrared Radiation Used as a Heat Source for Various Applications. *Industrial Heating,* v. 19, Aug. 1952, p. 1469-1470, 1472, 1474, 1476.

Many baking, degreasing, curing, preheating, and similar jobs have been speeded up by the comparatively new far-infrared radiant heaters. This rather different heat source radiates its energy in the almost invisible "far-infrared" portion of the spectrum. Advantages over conventional infrared. Typical installations. (L general, B18)

803-L. Selection of Metals Suitable for Heat Resistant Ceramic Coatings. *Industrial Heating,* v. 19, Aug. 1952, p. 1500.

Discussion on basis of guide prepared by Barrows Porcelain Enamel Co., Cincinnati, Ohio. (L27, SG-h, ST)

804-L. Tentative Recommended Practice for Painting and Repainting Elevated Steel Water Storage Tanks, Standpipes, and Reservoirs. *Journal, American Water Works Association,* v. 44, Aug. 1952, p. 749-764. (L26, ST)

805-L. The Work of the Protective Coatings (Corrosion) Sub-Committee; British Iron and Steel Research Association. F. Fancutt and J. C. Hudson. *Journal of the Oil & Colour Chemists' Association,* v. 35, Aug. 1952, p. 396-416; disc. p. 416-417.

Investigations of protective coatings for structural iron and steel extending over 30 years. In the field of painting, research has shown the vital importance of correct surface preparation and the value of using inhibitive priming paints. Basic data were obtained for the performance of Al, Cd, Pb, Sn, and Zn coatings under various conditions of atmospheric exposure. Diagrams. (L26, Fe, ST, Al, Cd, Zn, Pb, Sn)

806-L. Powdered Aluminum Paint Forms Aerodynamic Film on Aircraft Fuel Tank. *Light Metal Age,* v. 10, Aug. 1952, p. 19.

Application at Ryan Aeronautical Co. (L26, Al)

807-L. Electroplating Large Complex Shapes. F. K. Savage, A. K. Graham, and E. P. Strothman. *Materials & Methods,* v. 36, Aug. 1952, p. 94-97.

Successful use of electroplated coatings on large chemical equipment demonstrates that where applicable, they cost less than clad metals and solid metals and alloys. (L17, ST)

808-L. Can Linings. S. L. Flugge and J. C. Brichta, Jr. *Modern Packaging,* v. 25, Aug. 1952, p. 131-134, 188.

Recent developments in protective internal coatings for steel and tinplate. (L general, St, Sn)

809-L. Protective Coating Research by the Corps of Engineers. *Paint and Varnish Production,* v. 42, Aug. 1952, p. 17-22, 45-47.

Facilities and research programs of Engineer Research and Development Laboratories, Fort Belvoir, Va. (L26)

810-L. Battelle Memorial Institute. E. E. McSweeny. *Paint Industry Magazine,* v. 67, July 1952, p. 21.

Facilities for research and development in the field of protective organic coatings. (L26)

811-L. Chromizing. Shigetomo Ueda. *Reports of the Casting Research Laboratory,* no. 3, 1952, p. 59-60.

Experiments on pure iron and low-carbon steel treated by means of the chromous chloride process and of carbon steel treated by means of the chromium powder process. (L15, CN, Fe)

812-L. Coated Abrasives Grind Down Costs. Robert E. Hall. *Steel,* v. 131, Aug. 25, 1952, p. 92-97.

A special report on equipment, procedures, and applications. Claims impressive cost reductions and rapid expansion in applications. (L10)

813-L. (German.) Influence of Anode Apertures and Specially Shaped Anodes on Distribution With Depth in Galvanic Baths. J. Steiner and K. Schery. *Metalloberfläche,* sec. B, v. 4, Aug. 1952, p. B113-B116.

Influence on metal distribution at hollow-cylinder cathodes. Diagrams and graphs. (L16)

814-L. (German.) Anodic Oxidation of Small Aluminum Parts. Heinz W. Dettner. *Metalloberfläche,* sec. B, v. 4, Aug. 1952, p. B116-B118.

Problems encountered in anodic oxidation of small parts in large quantities. Various solutions suggested in a number of German patents. Diagrams. (L19, Al)

815-L. (German.) Observations on Iron Tips in the Field-Electron Microscope. Hans-Walter Schleicher. *Zeitschrift für Naturforschung,* v. 7a, July 1952, p. 471-474.

An electrolytic polishing process for producing fine iron tips. Field-electron microscope pictures of such tips are shown to vary greatly. The great differences between iron tips and tungsten or molybdenum tips are ascribed to iron oxide films, the extreme tip being suspected to be an Fe_3O_4 crystal. Diagrams and photographs. (L13, M21, Fe)

816-L. Metal Spraying in the Reclamation of Worn Engine Parts. Donald E. Harris. *Australasian Engineer,* July 7, 1952, p. 58-61; disc., p. 61.

The molten metal and powder processes of metal spraying, plus explanation of the wire pistol used. (L23)

817-L. Electro-Spray Process Saves Time and Paint. Gene Anderson. *Automotive Industries,* v. 107, Sept. 1, 1952, p. 74, 98.

Process used for automobile frames. (L26, ST)

818-L. How Chrysler Cleans Car Bodies for Painting. J. D. Speirs. *Canadian Metals,* v. 15, Aug. 1952, p. 46, 48.

Phosphating process, used for cleaning metal preparatory to painting, a chemical treatment in which the surface of the metal is, by a chemical reaction, converted to a protective phosphate coating. (L14)

819-L. Porcelain Enamel Protects Pipe. *Chemical Engineering,* v. 59, Aug. 1952, p. 190.

Application of porcelain enamel coatings in fluxing and degassing Al alloys to inhibit corrosion of black steel pipes. (L27, ST)

820-L. Experiments With White Enamel Directly to Steel. A. L. Friedberg. *Finish,* v. 9, Sept. 1952, p. 23-26.

A progress report including treatment of steel, and study of effects of pre-enameling treatment on bond and appearance. Photographs and table summarize results. (L27, ST)

821-L. Oxy-Acetylene Build-Up Saves $1000. *Industry & Welding,* v. 25, Sept. 1952, p. 92-93.

See abstract of "Just a Repair? Or an Improvement?" *Welding Engineer,* item 838-L, 1952. (L24, CI, Cu, SG-f)

822-L. The Electrodeposition of Silver on an Iron-Nickel Alloy for a Glass-to-Metal Seal Arrangement. R. T. Foley, R. D. Alvord, and J. K. Easley. *Journal of the Electrochemical Society,* v. 99, Sept. 1952, p. 349-353.

A method of Ag plating a 58% Fe, 42% Ni alloy to produce an electrodeposit capable of withstand-

ing annealing at 850° C. Surface preparation of the alloy, proper salt concentration of the "strike' bath, and the plating step. Photomicrographs. (L17, Ag, Fe, Ni)

823-L. Electrolytic Determination of Tin and Tin-Iron Alloy Coating Weights on Tin Plate. C. T. Kunze and A. R. Willey. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 354-359.

Previously abstracted from *Steel*, item 133-L, 1952. (L17, Sn, Zn, Ni)

824-L. Cleaning Metals. Frank Spicer. *Machinery* (London), v. 81, Aug. 21, 1952, p. 328-331.

Various types of chemical methods. (L12)

825-L. Hard Chrome Plating of Aluminium. E. Mayer-Rässler. *Metal Industry*, v. 81, Aug. 15, 1952, p. 127-129.

Successful method used in applying the Cr plate. Photomicrographs. (L17, Cr, Al)

826-L. Getting the Most From HAE Coatings. M. Frager and H. A. Evangelides. *Metal Progress*, v. 62, Sept. 1952, p. 81-84.

The HAE electrolytic coating for Mg and Mg alloys is a nonmetallic coating which is very hard and adherent. Results of salt-spray tests. Suitable paint coatings for application on top of the HAE coatings. (L17, R11, Mg)

827-L. Electrotinning Copper Wire in Alkaline Bath. *Metal Progress*, v. 62, Sept. 1952, p. 126, 128. (Condensed from "Electrotinning Copper Wire: A New Process, Part I. The Process", Frederich A. Lowenheim, *Wire and Wire Products*, v. 27, May 1952, p. 464-467, 506-507.) (L17, Cu, Sn)

828-L. British Views of Metal Finishing in America. *Metal Progress*, v. 62, Sept. 1952, p. 159-160. (Condensed from Productivity Report, "Metal Finishing", Anglo-American Council on Productivity).

Report by a group of Great Britain specialists who visited U. S. in 1950. Similarities between American and British plating practices. (L17)

829-L. Panel Discussions on Magnesium; Finishing and Joining. *Modern Metals*, v. 8, Aug. 1952, p. 49-52.

Second and last part of special report on series of panel discussions held last April by the Magnesium Association's Fabricating Division. Technical aspects of finishing and joining Mg. (L general, K general, Mg)

830-L. Automotive Production Finishing. Rick Mansell. *Organic Finishing*, v. 13, July 1952, p. 10-12, 16; Aug. 1952, p. 9-13.

Preparation of the surfaces of automobile parts for finishing. Part II: The actual finishing operations. (L26)

831-L. Painting by Flotation Method. L. B. Donovan. *Organic Finishing*, v. 13, Aug. 1952, p. 20-21, 23.

Previously abstracted from *American Paint Journal*, item 79-L, 1952. (L26, ST)

832-L. Rinsing. H. L. Pinkerton. *Plating*, v. 39, Sept. 1952, p. 1016-1017, 1031.

Revision of some equations of Kushner which the author believes to give impossible results. Improved equations for use in analysis of the process of rinsing articles after removal from the electroplating tank. (L17)

833-L. Hard Chromium Plate to Improve the Corrosion Resistance of Tool Steel. H. E. Ricks. *Plating*, v. 39, Sept. 1952, p. 1029-1030.

Corrosion protection offered by hard Cr plating was found to be proportional to the thickness of the Cr plate and to the surface smoothness of the panel before plating. (L17, R general, Cr)

AMERICAN CHEMICAL PAINT COMPANY

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Technical Service Data Sheet
Subject: PROTECTING ALUMINUM WITH ALODINE®

"ALODINE" No. 100

"Alodine" No. 100 forms an amorphous phosphate surface on aluminum which is thin, tough, durable, non-metallic, continuous with and a part of the basis metal. The "Alodine" film anchors paint, prolongs paint life, and protects aluminum exposed unpainted to the atmosphere.

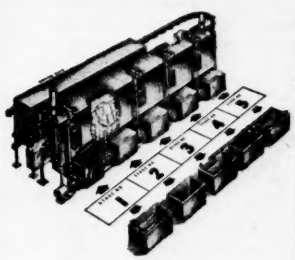
With the "Alodine" No. 100 bath at its normal temperature of 120° F., coating time by immersion approximates 1½ minutes—and by spraying, 15 to 20 seconds. Coating times and bath temperatures can be varied to suit operating conditions.

"ALODINE" No. 600

"Alodine" No. 600 forms corrosion-resistant coatings that provide excellent protection for unpainted aluminum and also make an effective paint-base. This grade is recommended for use in place of "Alodine" No. 100 on aluminum parts that are to remain unpainted or to be only partly painted; and on *all* aluminum castings and forgings whether or not these are given a paint finish.

"ALODINE" FLOW SHEETS

MULTI-STAGE POWER WASHER FOR SPRAY ALODIZING



IMMERSION TANKS FOR DIP ALODIZING

PROCESS SEQUENCE

1. Clean 2. Rinse 3. "Alodine" 4. Rinse 5. Final Rinse

NOTE: Equipment can be of mild steel throughout, except the "Alodine" stage which must be of acid-resistant material.

"Alodine" No. 600 is applied at room temperature (70° to 120° F.). Recommended coating times are 3 to 5 minutes for an immersion process and 1 to 1½ minutes for a spray process.

COATING DATA	"ALODINE" NO. 100	"ALODINE" NO. 600
COMPOSITION	Amorphous phosphate.	Amorphous mixture of metal oxides and chromates.
COLOR	Depending on alloy treated, color range is from an iridescent blue-green to a dark slate gray.	Depending on time of treatment, color range is from golden iridescent to light brown.
THICKNESS	From 0.01 to 0.08 mil. No appreciable dimensional changes occur when aluminum is Alodized.	From 0.005 to 0.01 mil. No appreciable dimensional changes occur when aluminum is Alodized.
WEIGHT	50 to 300 mgs. per square foot. Optimum: 100 to 200 mgs. per square foot.	35 to 50 mgs. per square foot.
SOLUBILITY	Insoluble in water, alcohol, solvents, etc. Insoluble in most dilute acids and alkalis. However, strong acids and alkalis which attack aluminum may penetrate the "Alodine" film and react with the underlying metal. Slightly soluble in concentrated nitric acid. Soluble in molten sodium nitrate, etc.	Insoluble in alcohol, water, solvents, etc. Soluble in strong alkalis and acids.
ELECTRICAL PROPERTIES	High dielectrical resistance.	This coating is electrically conductive. Aluminum coated with "Alodine" No. 600 can be shielded-arc welded or spot welded.
HEAT STABILITY	Unimpaired at temperatures that melt aluminum.	Unimpaired at temperatures that melt aluminum
FLEXIBILITY	Integral with and as flexible as the aluminum itself. Can withstand moderate draws.	Integral with and as flexible as the aluminum itself. Can withstand moderate draws.
ABRASION RESISTANCE	Approximately 90% of that provided by chromic acid anodized aluminum.	Approximately 90% of that provided by chromic acid anodized aluminum.
CORROSION RESISTANCE	Painted—superior to chromic acid anodizing. Unpainted—comparable with chromic acid anodizing. Meets MIL-C-5541 and other Government Finish Specifications.	Exceeds requirements of MIL-C-5541 and even AN-QQ-A-696a (anodic films)
PAINT-BONDING	Excellent. Equal to or superior to anodizing. Meets MIL-C-5541 and other Government Finish Specifications.	Excellent. Meets MIL-C-5541 and other Government Finish Specifications.
TOXICITY	Non-toxic.	Non-toxic.
BIMETALLIC CORROSION RESISTANCE	Shows good resistance against bimetallic or galvanic corrosion.	Shows good resistance against bimetallic or galvanic corrosion.

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WRITE FOR FURTHER INFORMATION ON "ALODINE" AND ON YOUR OWN ALUMINUM PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

834-L. Effect of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions. 5. The Effects and Removal of Zinc. D. T. Ewing, A. A. Brouwer, D. D. Clark, C. J. Owen, R. J. Rominski, and J. K. Werner. *Plating,* v. 39, Sept. 1952, p. 1033-1037.

Effect of trace amounts of Zn in nickel solutions on the properties of Ni electrodeposits. Graphs show effects of Zn concentration on luster of deposits, on throwing power of solutions, on corrosion resistance, and on hardness of the deposits. (L17, Q29, R general, Ni)

835-L. Slip Covers for Fuel Tanks. *Steel,* v. 131, Sept. 1, 1952, p. 87-88.

Air resistance of aircraft external fuel tanks is greatly reduced by a coating of zinc chromate solution and a synthetic rubber-base compound. (L26)

836-L. Welding Doubles Life of Forging Dies. Arthur L. Phillips. *Steel,* v. 131, Sept. 8, 1952, p. 86-87.

Newly developed welding technique prolongs life of drop-forging dies used in the manufacture of toolsteel claw hammers. Reversal of procedure of extending die life from shaving to building up by welding is applied. (L24, TS)

837-L. Keeping Big Equipment in Service. III. T. B. Jefferson. *Welding Engineer,* v. 37, Sept. 1952, p. 27-29.

Reclamation of large wearing surfaces on tractor and other parts to which the methods of automatic hard facing may be applied by manual arc welding. (L24)

838-L. Just a Repair? Or an Improvement? *Welding Engineer,* v. 37, Sept. 1952, p. 39, 48.

Method in which nickel silver brazing alloy is used to repair cast-iron flax drying heads of Cargill, Inc., Savage, Minn. (L24, CI, Cu, SG-f)

839-L. Proper Heat Applied to Galvanizing Pot. Max Mysell. *Western Metals,* v. 10, Aug. 1952, p. 46-48.

Proper heating gives good coating, long pot life, and fast production. (L16, CN, Zn)

840-L. Clad-Steel Sheets and Their Application in Chemical Engineering. Heinrich Canzler. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

Manufacturing process, base metal and cladding materials, mechanical and thermal properties, welding, and design and economic considerations. Photographs and construction diagrams for various apparatus. (L22, Q general, P11, ST, Cu, Ni, Ag)

841-L. Continuous Surface Treatment of Aluminium Strip for the Canning Industry. Dag Nickelsen. 4th International Mechanical Engineering Congress, June 1952, 9 pages.

Anodizing and lacquering processes at the Nordisk Co., Oslo, Norway. A company-developed Al-Mg alloy is used. (L19, L26, Al)

842-L. Surface Treatment for Saving and Substitution of Materials. H. Wiegand. 4th International Mechanical Engineering Congress, June 1952, 4 pages.

Classifies surface treatments and gives numerous brief examples or suggestions for their use. Includes mechanical, chemical, electrochemical, and diffusion processes, and coating with metallic and nonmetallic layers. Metals mentioned include carbon, alloy, and stainless steels, Al alloys, stellites, Zn, and Cr. Tabular data on influence of thread production and surface quality of thread on tensile fatigue strength of screws; and fatigue strength of piston pins, case hardened on all sides —for low alloy and C steels. (L general, Q7)

843-L. Ways and Means for the Economical Use of Zinc During Hot Dip Galvanizing. Hans Rueckemesser. *Draht* (Wire) (English Ed.), July 1952, p. 38-40.

Brief evaluation of pros and cons of various processes. (L16, Zn, CN)

844-L. The Application of Bonderizing to Steel and Iron Wire Drawing. *Draht* (Wire) (English Ed.), July 1952, p. 40-42.

General discussion. Saving of dies, increase of drawing speed, and other advantages where this method is employed. (L14, F28, ST, Fe)

845-L. The Control of Pickling Baths by Measuring the Electric Conductivity of the Pickling Liquid. Rudolf Bruehl. *Draht* (Wire) (English Ed.), July 1952, p. 52-53.

Experimental data on measurement of free acid on the basis of conductivity of the pickling liquid. (L12)

846-L. (French and German.) **The "Al-Fin" Process.** E. Herrmann. *Aluminium Suisse,* v. 2, July 1952, p. 115-125.

Process for joining of Al and its alloys to ferrous metals, and its application on the basis of the patent literature. Diagrams, photographs, and micrographs illustrate details of the process. (L22, Al, Fe)

847-L. (French.) **Cathodic Deposits in Monoatomic Layers of Bismuth on Platinum and Gold.** A. Coche, J. Danon, and M. El. Guébély. *Journal de Chimie Physique et de Physico-Chimie Biologique.,* v. 49, June 1952, p. 363-366.

Results of investigation are charted, tabulated, and discussed. (L25, Bi, Pt, Au)

848-L. (German.) **Cutting Edges Welded Onto Shearing Knives for Ingots and Billets.** H. Wolff and W. Hummitzsch. *Schweissen und Schneiden,* v. 4, Aug. 1952, p. 288-289.

By welding high speed steel edges on shearing knives of unalloyed steels, the life of such knives can be increased considerably. Technical and economic considerations. (L24, CN, TS)

849-L. Precision Investment Castings; Cleaning in Molten Caustic Soda. N. L. Evans. *Iron & Steel,* v. 25, Sept. 1952, p. 396-397.

Cleaning process which can be used for most metals (Fe, Ni, Cu, and alloys), notable exceptions being Sn, Pb, Zn, and Al. By using this method investment material is completely freed from the metal. (L12, E15, Fe, Ni, Cu)

850-L. Review of Surface Finish Literature. John W. Sawyer. *Machine Design,* v. 24, Sept. 1952, p. 147, 290, 292, 294, 296, 298, 301-302, 305-306.

Bibliography of literature published during years 1948-1951. (To be continued.) (L general)

851-L. Electroplating Steel Springs. *Metal Industry,* v. 81, Aug. 29, 1952, p. 167-168.

Recommendations issued by the Coil Spring Federation Research Organization. Principles for cleaning and electroplating hardened and tempered steel springs, or springs made from cold worked steels. (L17, T7, ST)

852-L. Chromate Protective Coatings. C. W. Ostrander. *Product Engineering,* v. 23, Sept. 1952, p. 127-134.

Application to nonferrous metals (Zn, Al, Cu, and Cu alloys). Method of application. Advantages are high resistance to corrosion, provision of firm bond for paint, and improved appearance of Zn and Cu plate. (L14, Zn, Al, Cu, Cr)

853-L. Teflon Components and Coatings. *Product Engineering,* v. 23, Sept. 1952, p. 149-153.

Properties and uses as a gasket material and as a protective coating on steel, cast iron, brass, and Cr. (L26, ST, Cu, Cr)

854-L. Hot Enamel Provides Finish on American Kitchens. Walter Rudolph. *Products Finishing,* v. 16, Sept. 1952, p. 22-26, 28.

Preparation and enameling of kitchen cabinets made of 10-gage, automobile grade sheet steel and coated with white DuPont Dulux enamel applied at 160° F. (L27, ST)

855-L. Surface Tension Control in the Plating Room. Joseph B. Kushner. *Products Finishing,* v. 16, Sept. 1952, p. 32-36.

Advantages; theory; surfactant (wetting agent) selection. A simple surface tension measuring device, the Sur-Ten-Meter. Photographs and diagrams. (L17, P10)

856-L. Chromic Acid Anodizing to Meet Military Specifications. *Products Finishing,* v. 16, Sept. 1952, p. 46, 48, 50, 52.

Practical aspects of chromic acid anodizing based on a recent paper by Herberth E. Head on experiences at Briggs Manufacturing Co., Detroit. (L19, ST)

857-L. Plating Cobalt-Tungsten-Molybdenum Alloys. *Products Finishing,* v. 16, Sept. 1952, p. 52, 54, 58, 60.

See abstract of "The Electrodeposition of Cobalt-Tungsten-Molybdenum Alloys From Aqueous Citrate Solutions", R. F. McElwee and M. L. Holt, *Journal of the Electrochemical Society;* item 172-L, 1952. (L17, Co, W, Mo)

858-L. Take Advantage of Modern Finish Application Methods. *Products Finishing,* v. 16, Sept. 1952, p. 60, 62, 66, 68.

Automatic spray finishing; hot spraying process (including hot spraying in relation to Quartermaster Corps requirements); conveyorized dipping; and electrostatic methods. (L26)

859-L. Nickel Dip in Porcelain Enameling. *Products Finishing,* v. 16, Sept. 1952, p. 70, 72.

Discussion based on several recent reports in the literature. (L27, Ni)

860-L. Hot Spray Lacquer Schedule for Finishing Armored Tank. *Products Finishing,* v. 16, Sept. 1952, p. 72, 74, 76.

Step-by-step schedule for hot spray lacquer application as used in a recent demonstration of the painting of an M46 Tank hull. Schedule conforms to the new military specification, MIL-L-11195. (L26, ST)

861-L. Tin Alloy Plating. *Products Finishing,* v. 16, Sept. 1952, p. 76, 78, 80. (Based on talks by F. A. Lowenheim, and by J. W. Cuthbertson and N. Parkinson).

Properties of Sn-Zn alloy deposits, bath formulations and conditions for shop use. Effect of variables on the composition and properties of Sn-Ni alloys plated from a bath containing stannous chloride, nickel chloride, sodium fluoride, and ammonium bifluoride. Corrosion resistance and formula. (L17, R general, Sn, Zn, Ni)

862-L. Lacquer Viscosity Affects Application Properties and Quality of Finish. *Products Finishing,* v. 16, Sept. 1952, p. 80, 82, 84, 86.

Based in part on data from Shell Chemical Corp. and Hercules Powder Co. (L26)

863-L. Precision Production Plating. Perry J. Sloane. *Screw Machine Engineering,* v. 13, Sept. 1952, p. 37-38.

The precision plating of small metal parts with precious metals. Ag or Au is deposited on various ferrous and nonferrous base metals. (L17, Ag, Au)

864-L. A Casting Process for Bonding Aluminium to Ferrous Metals (Al-Fin Process). G. Gürtler. 4th International Mechanical Congress, June 1952, 9 pages.

The process and the properties of the bond; applications. Photomicrographs of structure. (L22, Al, Fe, St)

865-L. Electro-Polishing and Material. Joseph Heyes. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

A survey aimed at drawing attention to the advantages of electropolishing. Test results in relation to fatigue, crystal structure, corrosion, light reflection, and friction and wear. Materials are steel and Al. Table, photomicrographs, and graphs. 11 ref.
(L13, M26, R general, Q7, Q9, P17, ST, Al)

866-L. (Book) **Finishing Handbook and Directory.** W. J. Roberts and A. G. Bennet, editors. 600 pages. 1952. Sawell Publications, Ltd., 4 Ludgate Circus, London E.C. 4, England. 15s.

Pretreatment processes, followed by paint finishes and the associated processes of lacquering, wood finishes, transfers, lining, and flock spraying. Further sections deal with electroplating, galvanizing and metal coloring. New sections cover marking processes, car finishes, and trick finishes. Tables, a comprehensive subject index and a directory of trade names, supplies, services and equipment. (L general)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

357-M. Quantitative Metallography With the Electron Microscope. Alfred L. Ellis and F. K. Iverson. *ASTM Bulletin*, July 1952, p. 66-69.

Principles and special problems involved in application of the electron microscope. It can be used advantageously when the particle size is very small. Representative sampling and reproducibility. Results are compared with those obtained by other methods. (M21)

358-M. The Use of Polarized Light for the Examination of Etched Metal Crystals and Their Orientation. P. Dunsmuir. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 264-267.

The practical case of examining cold rolled Si-Fe alloys for preferred orientation. Diagrams and macrographs. (M21, Fe)

359-M. The Thorium-Selenium System. R. W. M. D'Eye, P. G. Sellman, and J. R. Murray. *Journal of the Chemical Society*, July 1952, p. 2555-2562.

Thermal, metallographic, X-ray, and chemical analysis have unambiguously identified four phases: ThSe, Th_3Se_5, Th_7Se_{12}, and $ThSe_2$. Detailed information on lattice parameters and structures. Tables, graphs, and photomicrographs. (M24, Th, Se)

360-M. Microradiography With Alpha-Rays. Gunnar Aniansson and Naftali Steiger. *Nature*, v. 170, Aug. 2, 1952, p. 201-202.

Experiments were undertaken to determine potentialities and optimum conditions. The main advantage of using α-particles as compared with soft X-rays is much simpler apparatus needed and relative independence of absorption on composition of the object. (M23)

361-M. A New Molybdenum Carbide. K. Kuo and G. Hägg. *Nature*, v. 170, Aug. 9, 1952, p. 245-246.

Studies of products formed by carburizing Mo with CO confirmed existence of Mo_2C (β-phase) and MoC (γ-phase), the latter having the WC structure. In addition a new carbide was found. Describes its transformations and lattice parameters.
(M26, Mo, C-n)

362-M. Asymmetry of Texture in Cubic Crystals Grown From the Melt. P. R. Rowland. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 572-574.

Discussion of electropolishing of single-crystal spheres of Cu grown from melt revealed that they appear to consist of a number of parallel crystallites of square cross section with their lengths parallel to the (001) axis which lies nearest in direction to the "direction of growth" in the melt. (M26, Cu)

363-M. Diffraction by a Semi-Infinite Metallic Sheet. T. B. A. Senior. *Proceedings of the Royal Society*, ser. A, v. 213, July 22, 1952, p. 436-458.

With assumption of suitable boundary conditions, the problem of diffraction at a metal sheet is capable of exact solution. Corresponding to each of two fundamental polarizations, a pair of Wiener-Hopf integral equations is derived from which to determine electric and magnetic currents present in the sheet. One of these equations is subjected to a rigorous solution, and from it the solutions of the other three are deduced by symmetry considerations. Use of the generalized method of steepest descent then serves to determine the diffracted fields. 28 ref. (M22)

364-M. Some Corrections to Cast Iron Diagrams of Maurer and Others. Ichiro Iitaka. *Reports of the Casting Research Laboratory*, No. 3, 1952, p. 1-2.

Indicates corrections deemed necessary. (M24, CI)

365-M. Some Experiments on the Structure Diagram and the Annealing of Spheroidal Graphite Iron. Nobuhisa Tsutsumi. *Reports of the Casting Research Laboratory*, No. 3, 1952, p. 6-10.

Using synthetic iron containing no appreciable amounts of Mn, P, and S impurities, metallographic examinations were made in the as-cast and annealed condition on irons containing 2.4-4.5% C and 0-4.6% Si. Tables, graphs, and micrographs.
(M27, J23, CI)

366-M. Spheroidal Graphite Cast Iron. Takaji Kusakawa. *Reports of the Casting Research Laboratory*, No. 3, 1952, p. 11-14.

Effects of Ca on microstructure and mechanical properties were investigated. (M27, Q general, CI)

367-M. Research on Rapid Heating of Steels. Kiyoshi Yokota and Nobuhiro Iguchi. *Reports of the Casting Research Laboratory*, no. 3, 1952, p. 56-58.

Results of dilatometric and micrographic studies on Swedish mild steels. Illustrated. (M21, M23, CN)

368-M. Anisotropic Lattice Distortion. E. C. Williams. *Research*, v. 5, Aug. 1952, p. 392-393.

Calculation. Typical results are charted. (M26)

369-M. General Introduction, the Reciprocal Lattice. J. Bouman. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 3-18.

Mathematics of lattice structure and its analysis. Diagrams. (M26)

370-M. The Retigraph. W. F. de Jong. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes." (Interscience Publishers, New York), 1951, p. 19-31.

The retigraph is a moving-film apparatus which provides an undistorted photograph of a reciprocal lattice plane in contrast to the Weissenberg or Schiebold-Sauter camera. By photographing a number of parallel successive lattice planes and placing these at their appropriate distance and orientation, the complete reciprocal lattice may be obtained. (M22)

371-M. Termination Effects in X-Ray Fourier-Syntheses. L. L. Van Reijen. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 32-58.

Calculation of electron distribution from a set of Fourier coefficients. Errors, accuracy, termination factor, converging factor in 1-dimensional syntheses, elimination of termination effects, extension to 2 and 3-dimensional syntheses, and termination effects for diamond. 30 ref. (M22)

372-M. The Breadth of Debye-Scherrer-Lines, Caused by the Dimensions of the Crystal Particles. J. Bouman. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 59-71.

Mathematical analysis. (M22)

373-M. Calculation of the Stereographic Pole Figure of the Cubic Lattice for Any Given Direction (HKL). W. May. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 72-76.

Procedure. (M23)

374-M. Theoretical Considerations. J. Bouman. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 80-105.

Introductory chapter to series on distortions in crystals. 20 ref. (M26)

375-M. A Simplified Theory of the Diffuse Spots. J. Bouman. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes" (Interscience Publishers, New York), 1951, p. 106-112.

Modification of diffraction by crystals by heat motion is a special case of the general theory of lattice distortions. In this case it is possible to calculate exactly distribution of intensity in reciprocal space. A simplified treatment is given, restricted to a monoatomic lattice and to small displacements. (M22, M26)

376-M. The Diffuse Pattern of Tin Single Crystals. J. J. Arlman and J. Bouman. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York), 1951, p. 113-135.

Results of experiments. 18 ref.
(M26, Sn)

377-M. Lattice Distortions in Sheared Aluminium Single Crystals. W. G. Burgers and F. J. Lebbink. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes". (Interscience Publishers, New York). 1951, p. 146-158.

In not too severely deformed single crystals, plastic deformation is indicated by elongation of the Laue interference spots (so-called "asterism"), pointing to the occurrence of curved or broken-up lattice domains, which may have either a local character or spread over areas of larger size. Experiments on this type of diffraction phenomena. Al single crystals were subjected to careful deformation by "pure shearing" and the occurrence of asterism in the Laue photographs of the deformed crystals was analyzed and interpreted in connection with the supposed mechanism of the shearing process. 29 ref. (M22, M26, Q24, Al)

378-M. (French.) **Present State of the Metallography of Alloyed Austenites, Particularly in 18-8 Steel.** P. Bastien and J. Dedieu, *Métaux: Corrosion—Industries*, v. 27, June 1952, p. 237-244.

Influence of allotropy of iron, role of carbon, the carbides, the eutectoid composition, regions of coexistence of alpha, gamma, and carbide

phases. Includes schematic drawings and tabular data. 11 ref. (M24, N8, SS)

379-M. (German.) **The Iron-Iron Phosphide-Aluminum Phosphide-Aluminum Phase Diagram.** Rudolf Vogel and Helmut Klose. *Archiv für das Eisenhüttenwesen,* v. 23, July-Aug. 1952, p. 287-291.

Experimental and theoretical details of investigation, done in the Fe corner, on the basis of thermal and structural investigations. Results are interpreted. Diagrams and micrographs. (M24, Fe, Al)

380-M. (German.) **Copper-Beryllium Alloys, and Their Use in Industry.** W. Deisinger. *Metall,* v. 6, Aug. 1952, p. 436-440.

The binary Cu-Be system, and applications of Be-Cu alloys (Cu-base). Mechanical properties are charted. Micrographs illustrate typical structures. (M24, Q general, Cu)

381-M. (German.) **New Precision Cameras for X-Ray Investigation of Microstructures.** G. Freyer and Th. Lohmann. *Technik,* v. 7, Mar. 1952, p. 122-124.

New camera designs. Typical results. (M21)

382-M. Microconstituents in High Temperature Alloys. H. J. Beattie, Jr., and F. L. VerSnyder. *American Society for Metals,* Preprint 1, 1952, 27 pages.

By use of microstructural studies and X-ray diffraction analysis of electrolytically separated residues, the microconstituents of Fe, Co, and Ni-base high-temperature alloys were studied. Results show some of the effects of Te and Mo as alloying additions. Occurrence and suggested mode of formation of titanium carbonitride in a Ni-base age-hardenable alloy were determined. Conclusions applicable to most air-melted Te-containing alloys. The intermetallic compounds M_2Ti and Fe_2Al were identified. The second Brillouin zone is considered for the complex carbides M_6C and $M_{23}C_6$, with resulting determination of ratio of electron to metal atom capacity of about 7:1. 13 ref. (M27, Fe, Co, Ni)

383-M. Sigma Formation and Its Effect on the Impact Properties of Iron-Nickel-Chromium Alloys. A. M. Talbot and D. E. Furman. *American Society for Metals,* Preprint 2, 1952, 12 pages.

Approximate σ-phase boundaries between 1200 and 1650° F. were located by metallographic means for Fe-Ni-Cr alloys of relatively high alloy content and of simulated commercial quality. For conditions approaching equilibrium, the limiting σ-boundary was found to extend from about 21% Cr at 20% Ni to 24% Cr at 35% Ni. Effectiveness of Si in moving the sigma area to lower Cr contents. (M24, Q6, Fe, Ni, Cr)

384-M. The Titanium-Oxygen System. E. S. Bumps, H. D. Kessler, and M. Hansen. *American Society for Metals,* Preprint 32, 1952, 18 pages.

Details of partial phase diagram based principally on results of micrographic analysis of arc-melted alloys containing up to 30% O_2. Lattice-parameter measurements for both the α and TiO phases, and hardness-test results for alloys containing up to 30% O_2. Tables, graphs, and photomicrographs. 15 ref. (M24, Q29, Ti)

385-M. The System Zirconium-Tin. D. J. McPherson and M. Hansen. *American Society for Metals,* Preprint 34, 1952, 17 pages.

Zr-Sn alloys were prepared and heat treated under protective conditions. The phase diagram was established, based on micrographic and X-ray diffraction analysis, metallographic detection of incipient melting, and thermal analysis. Tables, graphs, and photomicrographs. (M24, Zr, Sn)

386-M. The Indium-Arsenic System. T. S. Liu and E. A. Peretti. *American Society for Metals,* Preprint 40, 1952, 9 pages.

Investigated by thermal, X-ray, and metallographic methods. Existence of an intermediate phase corresponding closely to the composition InAs was confirmed. (M24, In, As)

387-M. The System Zirconium-Silicon. C. E. Lundin, D. J. McPherson, and M. Hansen. *American Society for Metals,* Preprint 41, 1952, 14 pages.

Phase diagram was determined, with particular emphasis on the Zr-rich portion. The principal methods used were metallography of cast and heat treated specimens, detection of incipient melting, thermal analysis, and X-ray diffraction analysis. (M24, Zr, Si)

388-M. Titanium Metallography — Simple, Safe. *Iron Age,* v. 170, Aug. 28, 1952, p. 112.

Step-by-step description. (M21, Ti)

389-M. X-Ray Diffraction by Face-Centered Cubic Crystals With Deformation Faults. M. S. Paterson. *Journal of Applied Physics,* v. 23, Aug. 1952, p. 805-811.

Results of a calculation for face-centered cubic crystals in which the faults occur in (111) planes; detailed intensity distribution in the reciprocal lattice, the positions of the intensity maxima and their breadths, and other results expressed in terms of the density of faulting. 13 ref. (M22, M26)

390-M. The Metallography of Uranium. B. W. Mott and H. R. Haines. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 621-627.

Methods of preparing U for examination under polarized light, and relative merits of various solutions for electrolytic polishing. Structures observed on sections taken from material in cast, swaged, and hot worked conditions; effects of heat treatment and recrystallization. Future developments. 22 ref. (M21, M27, U)

391-M. The Application of Polarized Light to the Examination of Various Anisotropic Metals and Intermetallic Phases. B. W. Mott and H. R. Haines. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 629-636.

Details include methods of preparation of Sb, Be, Bi, Cd, Co, Mg, Sn, Ti, U, Zn, Zr, and of the alloys MgU, ThAl, ThSe, WC, and UAl. 50 ref. (M21)

392-M. The Equilibrium Diagram of the System Copper-Indium in the Region 25-35 At. % Indium. J. Reynolds, W. A. Wiseman, and W. Hume-Rothery. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 637-640.

Determination by thermal, microscopic, and X-ray methods. Diagrams and tables. (M24, In, Cu)

393-M. The Constitution and Structure of Nickel-Vanadium Alloys in the Region 0-60 At. % Vanadium. W. B. Pearson and W. Hume-Rothery. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 641-652.

Investigated by thermal, microscopic, and X-ray method. The θ phase is of variable composition, and its crystal structure has been determined. Effects of composition on the lattice spacings of the α, θ, and σ phases were studied; bearing of the results on the general theory of alloys. Diagrams and graphs. (M24, Ni, V)

394-M. The Constitution of Iron-Nickel-Chromium Alloys at 550-800° C. A. J. Cook and B. R. Brown. *Journal of the Iron and Steel Institute,* v. 171, Aug. 1952, p. 345-353.

Results obtained from metallographic and X-ray examination (including lattice-parameter measurements) of a series of high-purity Fe-Ni-Cr alloys in an attempt to establish the equilibrium constitution at 550° C. with particular reference to the development of sigma phase in the alloy system. The alloys investigated contained 0-40% Ni and 0-35% Cr. Tables, phase diagrams, and micrographs. (M24, Fe, Ni, Cr)

395-M. Observations on the Lattice Parameters of the Alpha and TiO Phases in the Titanium-Oxygen System. W. Rostoker. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 981-982.

Graphs. 14 ref. (M26, Ti)

396-M. System Molybdenum-Boron and Some Properties of the Molybdenum Borides. Robert Steinitz, Ira Binder, and David Moskowitz. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 983-987.

Discussed in relation to raw materials and preparation, experimental procedures, room-temperature phases, and structures and properties of Mo borides. The system was studied from 0 to 25% B. Structural, physical, mechanical and oxidation-resistant properties were determined. Diagrams, graphs, and tables. 14 ref. (M24, P general, Q general, R2, Mo)

397-M. Note on the Effect of Oxygen and Nitrogen on the Hardness and Lattice Parameter of High Purity Vanadium. S. Beatty. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 987-988.

Procedure and results. (M26, Q29, V)

398-M. An Automatic Thermal Analysis Recorder. R. L. Cunningham and W. P. Campbell. *Journal of Scientific Instruments,* v. 29, Aug. 1952, p. 252-253.

An inverse-rate recorder which can detect thermal effects to within 0.2° C. Position of each line represents a set temperature, while length of the line represents time required for the sample to change from the previous temperature. (M23)

399-M. A Simple Method of Determining Orientation in Recrystallized Wires of the Cubic System. T. S. Hutchison. *Journal of Scientific Instruments,* v. 29, Aug. 1952, p. 257-258.

The method is used where the grain size is greater than 10^{-2} cm. Standard physics laboratory equipment is used. (M26)

400-M. A Simple Method of Determining the Azimuthal Orientation of Single Crystals With the Weissenberg Goniometer. D. S. Beard. *Journal of Scientific Instruments,* v. 29, Aug. 1952, p. 268.

Application in which only recognition of a principal row of lattice points is required. (M26)

401-M. Nature of Bainite. *Metal Progress,* v. 62, Sept. 1952, p. 124. (Condensed from "Report of Committee E-4 on Metallography", *American Society for Testing Materials,* Preprint 53, 1952.)

Previously abstracted from original; see item 267-M, 1952. (M27, ST)

402-M. Thermal Etching of Iron and Steel. M. J. Olney. *Metal Treatment and Drop Forging,* v. 19, Aug. 1952, p. 347-354.

Survey of literature with special reference to the theoretical aspects. Experimental results obtained by heating and cooling polished steel specimens "in vacuo". Photomicrographs. 27 ref. (M21, Fe, ST)

403-M. Aligning Single Crystals for X-Ray Diffraction. L. S. Birks and A. B. Wing. *Review of Scientific Instruments,* v. 23, Aug. 1952, p. 442-443.

A step-by-step procedure for optical alignment of single crystals. Such alignment eliminates the necessity of the preliminary photograph for determining the final settings of the goniometer arcs in the Weissenberg or precession techniques. (M22)

404-M. (French.) **Wire-Form Anticathodes: Application to X-Ray Diffraction by Crystals.** Jean Barraud and Claire Pierrée. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, July 7, 1952, p. 72-74.

Wire-form anticathodes were used for obtaining Laue diagrams of various crystal structures. Advantages of the method. (M22)

405-M. (German.) **How to Embed Microsections in Casting Resin.** Cord Peterson. *Zeitschrift für Metallkunde,* v. 43, July 1952, p. 250-251.

Diagrams and describes suitable method. (M21)

406-M. (German.) **Structure of the Copper-Germanium System.** Konrad Schubert and Gundolf Brandauer. *Zeitschrift für Metallkunde,* v. 43, July 1952, p. 262-268.

Reports on high-temperature X-ray investigations of the above system. Their structures are interpreted. Data are tabulated and charted. 34 ref. (M24, M27, Cu, Ge)

407-M. (Russian.) **Saturation of the Surface of Steel by Tungsten From Gaseous Media.** G. N. Dubinin. *Doklady Akademii Nauk SSSR,* new ser., v. 84, June 1, 1952, p. 693-696.

Iron and steel (0.1-1.2% C) specimens were used in the investigation. Data are tabulated, charted, and illustrated. Includes W-Fe diagram. (M24, N1, W, ST)

408-M. (Russian.) **New Phases in the Aluminium - Germanium - Sodium and Aluminum - Germanium - Lithium Systems.** E. A. Boom. *Doklady Akademii Nauk SSSR,* new ser., v. 84, June 1, 1952, p. 697-699.

Results of a microscopic study. (M24, Al, Ge, Na, Li)

409-M. (Russian.) **Rounding of Obstacles by the Front of a Growing Layer of a Crystal Face.** G. G. Lemmlein. *Doklady Akademii Nauk SSSR,* new ser., v. 84, June 21, 1952, p. 1167-1169.

A microscopic study was made of the growth of thin layers (spiral or plane) of SiC crystals around obstacles. (M26, Si, C-n)

410-M. (Russian.) **Crystal Structure of the Ternary Phase Cu_2MgSn.** E. I. Gladyshevskii, P. I. Kripiakevich, and M. Iu. Tesliuk. *Doklady Akademii Nauk SSSR,* new ser., v. 85, July 1, 1952, p. 81-84.

X-ray, thermal, and microscopic investigations on the above system. Data are tabulated. (M26, Cu, Mg, Sn)

411-M. (French.) **Dilatometric Study of Metallic Dysprosium.** Félix Trombe and Marc Föex. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, July 16, 1952, p. 163-165.

Results of investigation, in the region −195 to +300° C., charted and compared with those previously reported for gadolinium. (M23, Dy)

412-M. (French.) **Evidence of the Heterogeneity of a Solid Solution in Equilibrium.** Christopher B. Walker, Jean Blin, and André Guinier. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, July 21, 1952, p. 254-255.

Redistribution of the atoms in a solid solution, where the atoms have a tendency to separate, was investigated by means of X-ray diffraction. Results for an Al alloy containing 20°% Ag. (M26, N12, Al)

413-M. (French.) **Micrographic Coloring Reagents for Iron and Steels.** L. Beaujard. *Revue de Métallurgie,* v. 49, July 1952, p. 531-538.

Use of various reagents for studying the structure of surface layers. Use and results with sodium bichromate, sodium nitrate, and sodium nitrite. Micrographs. (M21)

414-M. (German.) **Research on Surface Structures With the Aid of Adsorption and Catalysis.** E. Cremer. *Zeitschrift fur Elektrochemie; Berichte der Bunsengesellschaft fur Physikalische Chemie,* v. 56, No. 5, 1952, p. 439-446; disc., p. 446.

Theoretical and experimental discussion shows that catalytic reactions, adsorption isotherms, and the adhesiveness of powders are valuable aids to the study of surface structures of metallic and nonmetallic materials. Graphs, tables, and diagrams. 43 ref. (M23)

415-M. (German.) **Formation of Nuclei and Orientation of Materials Deposited on Different Types of Crystalline Substances.** A. Neuhaus. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 56, No. 5, 1952, p. 453-458.

Review of recent methods and results. Experimental results obtained by the high vacuum process and their importance to the kinetics of reactions and molecular energy. Inorganic salts, organic compounds, and silver were deposited on nonmetallic bases. Photomicrographs and tables. 23 ref. (M26, Ag)

416-M. (Italian.) **Contribution to Investigation of the Cr_2O_3-FeO-SiO_2 System.** Raffaello Zoja. *Metallurgia Italiana,* v. 44, July 1952, p. 247-249.

Special difficulties encountered in investigation of this type of system. Procedures developed to overcome them. By these means position of the three binary eutectics and of the ternary eutectic was determined rather approximately. (M24, SS)

417-M. (Swedish.) **X-Ray Analysis of Carbides in Tungsten Steel.** Kehsin Kuo. *Jernkontorets Annaler,* v. 136, No. 6, 1952, p. 156-168.

Results of experimental investigation of phases existing at different temperatures and their transformations. Tables and X-ray patterns. 17 ref. (M26, TS, C-n)

418-M. (Book.) **Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes.** J. Bouman, editor. 375 pages. 1951. North-Holland Publishing Co., Amsterdam; and Interscience Publishers, 250 5th Ave., New York. (Monographs on Theoretical and Applied Physics, Vol. III.) $11.00.

Consists of 25 chapters classifed in 8 sections: general methods of structure analysis, crystal distortions; recrystallization of Al; photographic emulsions and silver halide crystals; amorphous states of Hg, Sb, Se, and S; quantitative structure determinations; crystallinity of natural rubber; and biological investigations. Selected reports of metallurgical or general interest are separately abstracted. (M26)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

249-N. Theory of Grain Boundary Diffusion. R. Smoluchowski. *Physical Review,* ser. 2, v. 87, Aug. 1, 1952, p. 482-487.

The previously proposed dependence of structure of grain boundaries upon angle of disorientation of the two grains is used as a basis of a quantitative consideration of diffusion along grain boundaries and in particular of apparent activation energies. At small angles in the dislocation range, diffusion is controlled by a volume-diffusion mechanism. At high angles near 45°, the model of a uniform grain boundary is applicable. In the intermediate range, an array of rod-like areas of distorted lattice leads to low or even negative apparent activation energies. Theory is in good agreement with experiment. 12 ref. (N1)

250-N. The Growth From the Melt of Single Crystals of Low Melting Point Metals. A. J. Goss and S. Weintroub. *Proceedings of the Physical Society,* v. 65, sec. B, Aug. 1, 1952, p. 561-571; disc., p. 571-572.

Experiments on preparation of Sn, Pb, Zn, and Bi single crystals in the form of rods. Effects on crystallization of temperature gradient and rate of growth. Tables and graphs. (N12, Sn, Pb, Zn, Bi)

251-N. Stimulated Crystals, Twinning and Rate of Nucleation During Recrystallization of Aluminium. J. Sandee, W. May, and W. G. Burgers. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes" (Interscience Publishers, New York), 1951, p. 161-170.

Correlates and critically discusses observations reported in the literature. 18 ref. (N5, Al)

252-N. (German.) **Diffusion in Solid Metals.** W. Seith and A. Kottmann. *Angewandte Chemie,* v. 64, July 21, 1952, p. 379-391.

The connection between partial diffusion coefficients determined by radioactive methods and chemical partial diffusion coefficients determined from shifting of markers is experimentally verified. Changes in shape and dimension and occurrence of cavities caused by the process of diffusion were examined in the systems Ni-Cu, Ag-Pd, and Fe-Ni. The diffusion mechanism in metallic mixed crystals in connection with the experimental results. Photomicrographs, tables and graphs. 21 ref. (N1, Ni, Cu, Ag, Au, Pd, Fe)

253-N. The Electrolytic Separation and Some Properties of Austenite and Sigma in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel. T. P. Hoar and K. W. J. Bowen. *American Society for Metals,* Preprint 4, 1952, 19 pages.

Experimental technique and results. Transformations of extracted and massive austenite are compared. Ferromagnetic properties at low temperatures, compositions, and electrode potentials of the two varieties, are also compared. (N8, P15, P16, SS)

254-N. Recrystallization and Grain Growth in Alpha Brass. S. L. Channon and H. L. Walker. *American Society for Metals,* Preprint 8, 1952, 20 pages.

Cold rolled commercially pure 70-30 cartridge brass samples of different initial grain sizes were annealed isothermally at various temperatures for various times. Recrystallized grain size was found to be independent of temperature of annealing, and was related to the degree of deformation by an empirical equation. 20 ref. (N5, N3, Cu)

255-N. The Effect of Composition on the Temperature of Spontaneous Transformation of Austenite to Martensite in 18-8 Type Stainless Steel. G. H. Eichelman, Jr., and F. C. Hull. *American Society for Metals,* Preprint 9, 1952, 19 pages.

Determined by dilatometric measurements. It can be expressed by a

simple linear equation. Relative effectiveness of the additions, in their normal composition ranges, in lowering the M_s temperature increases in the following order: Si, Mn, Cr, Ni, C, and N_2. M_s changes caused by carbide precipitation can be used as a sensitive means for determining solubility of C in stainless steel. (N8, SS)

256-N. The Order-Disorder Transformation Viewed as a Classical Phase Change. F. N. Rhines and J. B. Newkirk. *American Society for Metals,* Preprint 12, 1952, 18 pages.

The question of whether order-disorder transformations are normal Gibbsian phase changes, or are 2nd-order transformations, is reviewed by re-examination of published evidence and by new resistivity and X-ray diffraction observations on Cu-Au and Cu-Zn alloys. All of the evidence supports the view that order-disorder transformations are normal phase changes. (N10, Cu, Au, Zn)

257-N. The Martensite Transformation Temperature in Titanium Binary Alloys. Pol Duwez. *American Society for Metals,* Preprint 35, 1952, 7 pages.

The temperature was measured in binary alloys of Ti with Cb, Ta, W, Fe, Cr, and Mn. The critical concentration above which the β-structure is retained after quenching in the above-mentioned binary alloys is discussed in connection with results published by other investigators. 13 ref. (N9, Ti, Cb, Ta, W, Fe, Cr, Mn)

258-N. Formal Basis for Diffusion Theory. L. S. Darken. *American Society for Metals.* "Atom Movements", 1951, p. 1-25.

Fick's law for the cases where the diffusitivity is a constant and for more complicated binary systems. Multicomponent systems; the current binary system method is not applicable to these. Some data on diffusion of C in Fe-C alloys; in the Ni-Cu system; and in the Au-Ni; Au-Pd; and Au-Pt systems. Diagrams and graphs. 36 ref. (N1, Fe, Ni, Au, Pd, Pt, Cu)

259-N. Chemical Techniques and Analysis of Diffusion Data. Cyril Wells. *American Society for Metals.* "Atom Movements", 1951, p. 26-50.

Chemical, spectroscopic, and vacuum-fusion methods used in securing diffusion data. How to obtain maximum amount of precise information. Examples discussed from the literature include diffusion data on: Zn in α-brass; carbon steel; Cu-α-brass; Fe-steel; carburized Fe; boron steel; H-Fe; and Mo and inert markers in brass. Graphs, diagrams, and tables. 30 ref. (N1)

260-N. Tracer and Other Techniques of Diffusion Measurements. R. E. Hoffman. *American Society for Metals.* "Atom Movements", 1951, p. 51-68.

The tracer technique and several other physical methods most applicable to the problems of the practicing metallurgist. Diagrams and photomicrographs. 86 ref. (N1, S19)

261-N. Mechanisms of Diffusion. H. B. Huntington. *American Society for Metals.* "Atom Movements", 1951, p. 69-86.

Diffusion in metals in the solid state. Mechanism in interstitial alloys and three possible mechanisms for substitutional alloys: direct interchange, interstitialcies, and vacancies. Examples from the literature. Diagrams. 33 ref. (N1)

262-N. Diffusion in Alloys and the Kirkendall Effect. J. Bardeen and C. Herring. *American Society for Metals.* "Atom Movements", 1951, p. 87-111.

Thermodynamics; phenomenological equations for vacancy diffusion; kinetic theory; and sources and sinks for vacancies (with example from a brass-Cu couple). Appendixes on relation of diffusion coefficients for a tracer; and for mass transport and distribution of atoms in multicomponent systems. Diagrams. 29 ref. (N1, P12, Cu)

263-N. Volume Diffusion—An Empirical Survey. C. E. Birchenall. *American Society for Metals.* "Atom Movements", 1951, p. 112-128.

Selective survey of results of volume diffusion measurements from an empirical point of view indicating some correlations and pointing out where additional data might help to settle critical theoretical questions. Defines volume diffusion, and considers the selected results for a variety of metals and nonmetals under the headings of structure, temperature, and concentration dependence. Graphs, tables, and photomicrographs. 45 ref. (N1)

264-N. Grain Boundary and Surface Diffusion. D. Turnbull. *American Society for Metals.* "Atom Movements", 1951, p. 129-152.

Analyses of the diffusion process for D_B, $D_S > D_l$, and the data and conclusions bearing on the interrelations between these diffusion coefficients. Literature data on various metals. Diagrams and tables. 43 ref. (N1)

265-N. Diffusion and High Temperature Oxidation of Metals. Carl Wagner. *American Society for Metals.* "Atom Movements", 1951, p. 153-173.

Review confined to the mechanism of diffusion processes in bulk layers. Literature data on sulfides, oxides, halides, and selenides of various metals. Tables and diagrams. 74 ref. (N1, R2)

266-N. Gas-Metal Diffusion and Internal Oxidation. F. N. Rhines. *American Society for Metals.* "Atom Movements", 1951, p. 174-191.

A review. Distinguishing features of gas-metal diffusion and main experimental facts, especially recent observations. Considers various metals, H_2, O_2, N_2, the noble gases, and the halogen gases. Micrographs, graphs, and diagrams. 26 ref. (N1, R2)

267-N. The Migration of Grain Boundaries. J. E. Burke. *American Society for Metals.* "Atom Movements", 1951, p. 209-232.

Migration of boundaries between metal domains which differ primarily in crystallographic orientation. The driving forces which are operating and variables affecting the rate of migration. Grain-boundary structure. 51 ref. (N1, M27)

268-N. Summary. Robert F. Mehl. *American Society for Metals.* "Atom Movements", 1951, p. 233-240.

A commentary on the 11 papers (abstracted separately) presented at the 32nd National Metal Congress and Exposition, Chicago, Oct. 21-27, 1950. Covers migration of grain boundaries, diffusion, and relation of latter to oxidation and sintering. (N1, R2, H15)

269-N. A Note on the Graphitization of Martensite. J. W. Grant. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Aug. 1952, p. 366-368.

Results of tests to investigte formation of graphite nodules from martensite, following heat treatment, in prequenched specimens of nodular and flake graphite irons. (N8, CI)

270-N. The Cubic-Tetragonal Transformation in Manganese-Copper Alloys. Z. S. Basinski and J. W. Christian. *Journal of the Institute of Metals,* v. 80, Aug. 1952, p. 659-666.

Mn-rich Mn-Cu alloys were investigated by X-ray and microscopic methods. Etched microspecimens of tetragonal alloys show a banded structure, which is also produced by heating and cooling electropolished specimens through the transformation range. Some difficulties in connection with possible dislocation theories of the actual atom movements are indicated. 19 ref. (N6, Mn, Cu)

271-N. Some Effects of Order-Disorder in Iron-Aluminium Alloys. W. D. Bennett. *Journal of the Iron and Steel Institute,* v. 171, Aug. 1952, p. 372-380.

Influence of varying degrees of order on magnetic and electrical properties of an alloy. Fe_3Al was used because it is magnetic, has a high electrical resistivity, and can readily be ordered or disordered by heat treatment. Graphs. 11 ref. (N10, P15, P16, Fe, Al)

272-N. Recrystallization Kinetics of Low Carbon Steel. Stanley F. Reiter. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 972-979.

Isothermal recrystallization curves for 0.08 and 0.15% C steel at subcritical temperatures following small amounts of plastic deformation. Effects of deformation, temperature, and aging on nucleation and growth rates; and free energy of activation for grain-boundary migration in steel. Micrographs, graphs, and tables. 16 ref. (N5, CN)

273-N. Do Metals Recrystallize? Paul A. Beck. *Journal of Metals,* v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 194, 1952, p. 979-980.

See abstract from *American Society for Metals,* "Metal Interfaces", item 193-N, 1952. (N5)

274-N. Effect of Cold Work on Sigma Formation. E. J. Dulis and G. V. Smith. *Metal Progress,* v. 62, Sept. 1952, p. 86-87.

Relationships between quantity of sigma phase, cold work and hardness in 25-20 Cr-Ni and 18-8 Cb stainless. Photomicrographs show structure. (N8, SS)

275-N. Effect of Deformtion on Transformation of Austenite to Martensite. *Metal Progress,* v. 62, Sept. 1952, p. 146, 148, 150, 152. (Translated and condensed from "Transformation of Deformed Austenite Into Martensite", G. V. Kurdyumov, O. P. Maksimova, and T. V. Tagunova, *Doklady Akademii Nauk SSSR).*

Previously abstracted from original. See item 248-N, 1950. (N8, AY)

276-N. Graphitization in Low-Carbon Steels. *Metal Progress,* v. 62, Sept. 1952, p. 180, 182. (Condensed from "Heterogeneous Nucleation of Graphite in Hypo-Eutectoid Steels", W. E. Dennis, *Journal of the Iron and Steel Institute,* v. 70, May 1952, p. 59-63).

Previously abstracted from original. See item 179-N, 1952. (N2, N8, CN)

277-N. (German.) **Self-Diffusion on Copper Surfaces.** Erich Menzel. *Zeitschrift für Physik,* v. 132, No. 4, July 1952, p. 508-528.

Measurement of self-diffusion and effect of time, temperature, and air, hydrogen, and oxygen pressures. The surrounding atmosphere was found to have a very material effect on the results. Photographs, diagrams, and graphs. 33 ref. (N1, Cu)

278-N. (Russian.) **Saturation of Steel Surfaces by Molybdenum From Gaseous Media.** G. N. Dubinin. *Doklady Akademii Nauk SSSR,* new ser., v. 84, June 11, 1952, p. 935-938.

Experiments were used to study diffusion and the properties of Fe-Mo alloys. Data are tabulated and illustrated. Phase diagram and micrographs. 12 ref. (N1, M24, Fe, Mo)

279-N. (Russian.) **The Influence of Concentrated Stresses on Diffusion in**

Solid Solutions. B. Ia. Liubov and N. S. Fastov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 939-941.

A mathematical discussion. (N1)

280-N. (Russian.) Impregnation of Steel Surfaces With Manganese From Gaseous Media. G. N. Dubinin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1155-1158.

A study of Fe-Mn alloys was made by the above method using iron (0.03% C) and steel (0.1-1.2% C) specimens. Includes tabular data, phase diagram of the Fe-Mn system, and photomicrographs. (N1, M24, Fe, Mn)

281-N. (English.) Crystal Growth and Dislocations. F. C. Frank. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, No. 5, 1952, p. 429-436; disc., p. 437-438.

Theoretical discussion. Examples of observations of various investigators. 21 ref. (N12)

282-N. (French.) Formation and Development of Zones and Precipitates in Supersaturated Solid Solutions. A. Guinier. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, No. 5, 1952, p. 468-473.

Formation and growth of crystal nuclei of an Al + 4% Cu alloy as a good example of the precipitation hardening. Graphs, tables, diagrams, and photomicrographs. 10 ref. (N7, Al)

283-N. (Book.) Atom Movements. 240 pages. 1951. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Comprises 11 papers presented at a seminar during the 32nd National Metal Congress and Exposition, Chicago Oct. 21-27, 1950, sponsored by the American Society for Metals. Topics include migration of grain boundaries, diffusion, and relation of latter to oxidation and sintering. Individual papers and a summary are separately abstracted. Subject index. (N1)

P

PHYSICAL PROPERTIES AND TEST METHODS

476-P. The Electrokinetics of Hydrogen Evolution. III. Hydrogen Overvoltage at Electrodeposited Copper Cathodes. William P. Senett and C. F. Hiskey. *Journal of the American Chemical Society*, v. 74, Aug. 5, 1952, p. 3754-3760.

Includes overvoltage measurements as a function of current density and temperature, and a study of time variations. Theory. Tables, graphs, and apparatus diagram. 14 ref. (P15, Cu)

477-P. Studies on Some Metal Electrodes. Part IX. The Temperature Coefficients of the Copper and Antimony Electrodes in Solutions Initially Free From Their Ions. The Mode of Oxidation of These Metals. A. Riad Tourky and E. M. Khairy. *Journal of the Chemical Society*, July 1952, p. 2626-2633.

Results are discussed in the light of the theory of lattice defects. (P15, R2, Cu, Sb)

478-P. A New Calculation of Some Properties of Metallic Beryllium. B. Donovan. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 868-874.

A quantum mechanical calculation of lattice constant, compressibility, cohesive energy, and work function of Be was carried out, using an extension of the cellular method of Wigner and Seitz. With exception of work function, the results agree satisfactorily with experiment and compare favorably with values obtained by more elaborate methods. Graphs. 14 ref. (P10, P15, Be)

479-P. The Electrical Resistance of Magnesium, Aluminium, Molybdenum, Cobalt, and Tungsten at Low Temperatures. J. G. Thomas and E. Mendoza. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 900-910.

Measurements of resistance in zero magnetic field; magnetoresistance and susceptibility. Graphs. 23 ref. (P15, Mg, Al, Mo, Co, W)

480-P. The Extra Electrical Resistance Due to Cold Work and Neutron Irradiation of Platinum. R. A. Dugdale. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 912-914.

Results of recent experiments on fixing of the extra resistance produced in Pt wire by cold work and by neutron bombardment. (P15, Pt)

481-P. The Coherent Neutron Scattering Cross Sections of Nitrogen and Vanadium. S. W. Peterson and Henri A. Levy. *Physical Review*, ser. 2, v. 87, Aug. 1, 1952, p. 462-463.

Neutron-diffraction measurements on vanadium nitride, vanadium carbide, and potassium azide show the coherent neutron scattering cross section of nitrogen to be 11.1 ± 0.3 barns, positive phase; and that of vanadium to be 0.029 ± 0.01 barn, negative phase. 11 ref. (P10, V)

482-P. Some Post-War Developments in Magnetism. L. F. Bates. *Proceedings of the Physical Society*, v. 65, sec. A, Aug. 1, 1952, p. 577-594.

A survey. 18 ref. (P16, SG-n, p)

483-P. Analysis of Polarized Light Reflected From Absorbing Materials at Normal Incidence. J. Woodrow, B. W. Mott, and H. R. Haines. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 603-616.

Expressions derived for intensity of analyzed light reflected from absorbing crystals under crossed polarizing units and with the analyzer slightly rotated from the crossed position. Relationships are illustrated by experimental curves on specimens of Sn, U, Bi, and stibnite. Graphs. 13 ref. (B17, Sn, U, Bi)

484-P. The Magneto-Resistance of Ferromagnetic Al-Si-Fe Alloys. R. Parker. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 616-620.

By extending the treatment in an earlier paper, an equation is derived for saturation magneto resistance of mixed ferromagnetic alloys as a function of composition and temperature. Results are in agreement with experiment for the Al-Si-Fe alloy system. (P16, Al, Si, Fe, SG-n, p)

485-P. Transparent Conducting Films. E. J. Gillham and J. S. Preston. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 649.

Results of observations on very thin gold films on glass and on oxide substrates, with respect to resistivity and optical properties. (P15, P17, Au)

486-P. Area Contacts on Germanium. J. W. Granville and H. K. Henisch. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 650-651.

Observations of Au contacts applied by evaporation in a vacuum to n-type germanium of 5 ohm-cm. resistivity and a Hall coefficient of about 10^4 cc. per coulomb. Graphs. (P15, Ge, Au)

487-P. Contact Properties of p-Type Germanium. J. W. Granville, H. K. Henisch, and P. M. Tipple. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 651-652.

Results of experimental study. (P15, Ge)

488-P. Influence of Added Elements and Condition of Graphite Upon Electrical Resistance of Cast Iron. Ichiro Iitaka and Kazuhiko Sekiguchi. *Reports of the Casting Research Laboratory*, No. 3, 1952, p. 23-25.

Results of experiments charted, tabulated, and discussed. (P15, CI)

489-P. (German.) The Conductivity of Pure Copper and the Effects of Additions on This Conductivity. F. Pawlek. *Metall*, v. 6, Aug. 1952, p. 434-435.

Conductivity of 99.997% pure sintered Cu wire, and increases in conductivity caused by small additions of Fe, Sb, Pb, As, Ni, Si, P, Ag, and Cd were determined. Details of the experiments; data are charted. (P15, Cu)

490-P. (German.) Electrochemical Transformations in Friction Systems at Elevated Temperatures, and Their Influence on Wear in Machines. H. Schiffers. *Metalloberfläche*, sec. A, v. 6, Aug. 1952, p. A120-A124.

The mechanism of friction, and the special conditions existing in machinery. Electrochemical transformations and laws governing these transformations. Data are tabulated. 14 ref. (P15, Q9)

491-P. (German.) Density Measurements on Molten Germanium and Tellurium. W. Klemm, H. Spitzer, W. Lingenberg, and H. J. Junker. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften*, v. 83, No. 3, 1952, p. 629-637.

The distinction between metals, "meta" metals, semiconductors, and nonmetals. On the nonmetallic side of the metal-nonmetal boundary, there are especially large interstitial lattice spaces which always are reduced in volume upon melting, after expanding upon melting. The volume of Te contracts again when the melting process is completed. Tables, diagrams, graphs. 15 ref. (P10, N12, Ge, Te)

492-P. Study of Metal-Ceramic Interactions at Elevated Temperatures. F. H. Norton and W. D. Kingery. *U. S. Atomic Energy Commission*, NYO-3139, Apr. 1, 1952, 65 pages.

Reviews literature pertaining to carbide, nitride, and sulfide reactions with metals. Samples of nitrides and carbides were prepared for use in reaction and surface-tension studies. Surface tension and wettability data for Fe, Ni, and Si on ceramic oxides. Additional improvements and tests of a microscopic furnace for sintering studies. Preparation of spherical particles of aluminum and zirconia. (P10, H10, H15, Fe, Ni, Si, C-n)

493-P. Vibralloy—a New Ferromagnetic Alloy. M. E. Fine. *Bell Laboratories Record*, v. 30, Sept. 1952, p. 345-348.

Cold-worked Fe-Ni alloys containing 9% Mo whose temperature coefficient of elastic modulus may be controlled over a wide range. Also they have substantial ferromagnetic permeability and high mechanical strength. Graphs show variation of Young's modulus and permeability with temperature and composition. (P16, Q21, Fe, Ni, SG-n, p)

494-P. Ultrathin Magnetic Alloy Tapes With Rectangular Hysteresis Loops. M. F. Littmann. *Electrical Engineering*, v. 71, Sept. 1952, p. 792-795.

The alloys chosen for study were those having high permeability and relatively high resistivity to minimize eddy-current effects. They were as follows: 3% Si iron; 48% Ni + 52% Fe; 79% Ni + 4% Mo + 17% Fe; and 79% Ni + 5% Mo + 16% Fe. They were rolled to thicknesses between ⅛ and 1 mil. D.C. magne-

tization curves, hysteresis loops, and variation of ratio of residual to maximum induction with magnetizing force for ¼-mil cores are charted. (P16, Fe, Ni, SG-n, p)

495-P. Electrical Contact Resistance Between Metallic Surfaces Subjected to Various Treatments. T. Fukuroi and Y. Muto. *Engineers' Digest*, v. 13, Aug. 1952, p. 261-262. (Condensed from *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 3, June 1951, p. 281-291).

Test apparatus and experimental results obtained with tungsten rods subjected to the following treatments: mechanical polishing, electropolishing, and electrolytic etching. Diagrams and tables. (P15, W)

496-P. How Ferromagnetism Works. R. H. Esling. *Iron Age*, v. 170, Sept. 11, 1952, p. 148-152.

Basic principles of ferromagnetism for understanding varied equipment such as electric generators and motors, lifting magnets, solenoids in switches and valves, and permanent-magnet applications. Diagrams. (P16, ST)

497-P. Measurement of the Internal Energy in Copper Introduced by Cold Work. Benjamin Welber. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 876-881.

Interpretation of a determination made on the ratio of stored energy to the energy expended in cold working Cu by twisting. Ratios of about 0.03 were found in three cylindrical samples which were cold worked to the extent of 8-12 cal. per g. 17 ref. (P12, Q24, Cu)

498-P. Phosphorus-Oxygen Equilibria in Liquid Iron. J. B. Bookley, F. D. Richardson, and A. J. E. Welch. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 404-412.

Study of thermodynamics of the P-O_2 equilibrium in liquid Fe by bringing the P content of liquid Fe to equilibrium with a mixture of tetracalcium phosphate ($Ca_4P_2O_9$) and CaO, and a controlled-gas atmosphere of water vapor and H_2. Graphs. 11 ref. (P12, Fe)

499-P. Effect of Manganese on the Activity of Sulphur in Liquid Iron and Iron-Carbon Alloys. J. P. Morris. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 939-940.

Experimental procedure and results of study. Tables and graphs. (P12, Fe)

500-P. Heats of Solution of Group I-B Metals in Liquid Tin. L. B. Ticknor and M. B. Bever. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 941-945.

An isothermal calorimeter for measurements of heats of solution in liquid tin. Measurements of the heats of solution of Au, Ag, Cu, and an Au-Ag alloy; and heat of formation of Au-Ag alloys. Tables and diagrams. 13 ref. (P12, Au, Ag, Cu)

501-P. The Specific Heats of Several Metals Between 1.8° and 4.2° K. I. Estermann, S. A. Friedberg, and J. E. Goldman. *Physical Review*, v. 87, Aug. 15, 1952, p. 582-588.

Specific heats of Mg, Ti, Zr, and Cr were measured between 1.8° and 4.2° K by the vacuum calorimeter method. Electronic contribution to specific heats of these metals was in agreement with the Sommerfeld theory and with results of recent detailed calculations of energy bands in transition metals. (P12, Mg, Ti, Zr, Cr)

502-P. Measurements on the Temperature, Current, Magnetic Field. Phase Diagram of Superconductivity. K. Mendelssohn, C. Squire, and Tom. S. Teasdale. *Physical Review*, v. 87, Aug. 15, 1952, p. 589-591.

Experiments were carried out to investigate the existence of a paramagnetic effect, at the transition to superconductivity. Work deals with induction measurements at constant values of magnetic field, current, and temperature. Diagrams and graphs. (P16, M24)

503-P. Carriers of Electricity in Metals Exhibiting Positive Hall Effects. Sheldon Brown and S. J. Barnett. *Physical Review*, v. 87, Aug. 15, 1952, p. 601-607.

Momentum associated with current in metals was measured under conditions in which they are known to have positive Hall coefficients. A coil of the wire was supported with its axis vertical. Extremely small deflections resulting from inertial effect of successive reversals of current were measured by a resonance method. Phototube and oscilloscope method for measuring both amplitude and phase of small deflections. (P15)

504-P. Progress in Core Material for Small Transformers. C. C. Horstman. *Westinghouse Engineer*, v. 12, Sept. 1952, p. 160-163.

Emphasis on Si steel (Hipersil) cores. Magnetic and electrical properties are charted. Fabrication equipment and procedures. (P15, P16, G general, AY)

505-P. (French.) Dilatometric Study of Metallic Gadolinium. Felix Trombe and Marc Foex. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 42-44.

Metallic Gd was investigated at temperatures between −195 and 300° C. Results are charted and interpreted. (P11, Gd)

506-P. (German.) Studies on the Anodic Behavior of Nickel. I. G. Trümpler and Hch. Meyer. *Helvetica Chimica Acta*, v. 235, No. 4, 1952, p. 1304-1310.

Experimental arrangement and results of investigation. Apparatus described makes it possible to follow the transition from an active state to a strongly passive one, also the reverse process. (P15, Ni)

507-P. (German.) Heat Transfer in Metal Melts in the Immediate Neighborhood of the Solid-Liquid Phase Boundary. Otto Schaaber. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 251-258.

The stationary heat flow near the fusion points of Zn, Al, and KNO_3 in vertical and horizontal directions was investigated. Experimental details and results. Proposes an explanation for peculiarities of the flow observed in a horizontal direction. Charts and diagrams. 12 ref. (P11, N12)

508-P. (German.) The Electrical Resistance of Thin Tin Films With Lattice Distortions. Johannes Niebuhr. *Zeitschrift für Physik*, v. 132, No. 4, July 1952, p. 468-481.

Study with different Sn thicknesses and temperature. Theoretical explanation of increasing specific resistance with decreasing thickness. Graphs and tables. 21 ref. (P15, Sn)

509-P. (Russian.) Investigation of Ferromagnetic Resonance in Cr-Te Alloys. T. M. Perekalina. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 475-476.

An experimental study of the Cr alloys containing 50 at.% Te. Data are charted. (P16, Cr, Te)

510-P. (Russian.) The Influence of Halide Ions on the Adsorption of Organic Cations by the Surface of Iron. Z. A. Iofa, E. I. Liakhovetskaia, and K. Sharifov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 543-546.

Data are tabulated and charted. 13 ref. (P13, Fe)

511-P. (Russian.) Paramagnetic Resonance Absorption in Metals. S. A. Al'tshuler, V. Ia. Kurenev, and S. G. Salikhov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 677-679.

Investigated for 20 nonferrous metals. Data are tabulated and charted. (P16, EG-a)

512-P. (Russian.) Temperature Dependence of the Magnetic Strength of Iron-Nickel Alloys. E. F. Kuritsyna. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 687-688.

Fe-Ni alloys containing 35, 50, and 78.5% Ni were investigated. Data are charted. (P16, Fe, Ni)

513-P. (Russian.) The Influence of Pressure on the Solubility of Molecular Hydrogen in the β-phase of the Palladium-Hydrogen System. P. S. Perminov, A. A. Orlov, and A. N. Frumkin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 749-752.

An experimental study. Data are tabulated and charted. (P13, Pd)

514-P. (Russian.) Adsorption and Solution of Hydrogen by Dispersed Palladium-Rhodium Alloys. I. P. Tverdovskii and A. I. Stetsenko. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 997-1000.

An experimental study. Data are charted. (P13, Pd, Rh)

515-P. (Russian.) Study of Liquid Iron-Phosphorus Alloys by an Electromotive-Force Method. O. A. Esin, L. K. Gavrilov, and N. A. Vatolin. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 87-89.

The Fe-P system was studied in relation to melt-slag reactions. Data tabulated and charted. (P12, Fe, ST)

516-P. The Reactions of Titanium Tetraiodide on Heated Titanium and Tungsten Surfaces. T. R. Ingraham and L. M. Pidgeon. *Canadian Journal of Chemistry*, v. 30, Sept. 1952, p. 694-697.

A study in relation to refining problems. When TiI_4 is passed over a hot bar of Ti metal, reactions depend on whether temperature of bar is above or below 1100° C. If temperature is below 1100° C., Ti is rapidly etched from bar to form TiI_2, which through further reaction with TiI_4 is converted to TiI_3. Above 1100° C., TiI_4 is decomposed to Ti and I_2. When a tungsten bar is used, etching and deposition reactions of Ti are separated. (P13, Ti, W)

517-P. Permanent Magnets Increase Capacity and Life of Switch Contacts. R. B. Immel. *Machine Design*, v. 24, Sept. 1952, p. 132-138.

Addition of permanent magnets to the contacts on d.c. switches provide an effective arc blowout field and greatly increases their interrupting capacity. This eliminates necessity for additional contactors and relays normally required to handle the circuits of standard manual master switches. Data for various Alnico compositions are charted. (P16, SG-n, Al, Ni, Co)

518-P. The Gyromagnetic Ratios of the Ferromagnetic Elements. G. G. Scott. *Physical Review*, ser. 2, v. 87, Sept. 1, 1952, p. 697-699.

Gyromagnetic ratios for Fe, Co, and Ni were determined by means of a technique involving a sensitive torsional pendulum. Results on Ni and Co. Tables. (P16, Ni, Co, Fe)

519-P. Gyromagnetic Ratios of Iron, Cobalt, and Many Binary Alloys of Iron, Cobalt, and Nickel. S. J. Barnett and G. S. Kenny. *Physical Review*, ser. 2, v. 87, Sept. 1, 1952, p. 723-734.

Gyromagnetic ratios were determined by measurements on the Einstein-de Haas effect as made in the Norman Bridge Laboratory. Improvements were made in method of eliminating large quadrature torques, in method of reducing disturbances due to vibrations of building, in method of frequency control, in design of square wave commutator, and in design of rotors. Photographs, graphs, and tables. (P16, Fe, Co, Ni)

520-P. The Magnetic Properties of Superconducting Alloys of Indium and Thallium. W. F. Love, E. Callen, and F. C. Nix. *Physical Review,* ser. 2, v. 87, Sept. 1, 1952, p. 844-847.

Magnetization curves for spherical samples of a series of alloys in the solid solution range of Tl in In were measured as a function of temperature and composition, and critical field curves were obtained. Graphs. (P16, In, Tl)

521-P. The Spectroscopy of the Solid State: Copper and Chromium. E. M. Gyorgy and G. G. Harvey. *Physical Review,* ser. 2, v. 87, Sept. 1, 1952, p. 861-862.

M_{23} emission curves of Cu and Cr were obtained by using a vacuum recording spectrograph. Tabulated results. (P17, Cu, Cr)

522-P. Optical Polarization in Single Crystals of Tellurium. J. J. Loferski. *Physical Review,* ser. B, v. 87, Sept. 1, 1952, p. 905-906.

Transmission of Te crystals was observed in the infrared, and measured as a function of polarization of incident radiation relative to the C-axis of the crystal. Graphs present results. (P17, Te)

523-P. Neutron Total Cross Section for Lead Between 37 and 156 Mev. A. E. Taylor and E. Wood. *Physical Review,* ser. B, v. 87, Sept. 1, 1952, p. 907-908.

Method and results. (P10, Pb)

524-P. Size Effects in the Superconductivity of Cadmium. M. C. Steele and R. A. Hein. *Physical Review,* ser. B, v. 87, Sept. 1, 1952, p. 908.

Electrical and magnetic properties of matter below 1° K. Cd pellets were used. (P15, P16, Cd)

525-P. (French.) Contribution to the Study of the Conductivity of Silicon. Marcel Perrot and Jean Tortosa. *Comptes Rendus hebdomadaires des Seances de l'academie des Sciences,* v. 235, July 16, 1952, p. 143-145.

Conductivity of thin strips of Si prepared by thermal evaporation of a 98.75% Si thin film onto glass. Results are charted. (P15, Si)

526-P. (French.) Semiconductive Properties of Tellurium. Pierre Aigrain, Claude Dugas, Jacques Legrand des Cloizbeaux, and Bernard Jancovici. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, July 16, 1952, p. 145-146.

Properties and structure of a semiconducting Te monocrystal were studied by means of electric conductivity and Hall-effect measurements at various temperatures between that of liquid nitrogen and 50° C. (P15, Te)

527-P. (Book.) Industrial Magnetic Testing. N. S. Asprey. 132 pages. Mar. 1952. Institute of Physics, 47 Belgrave Square, London. S.W. 1, England. 25s.

Although this book contains a chapter entitled "Permanent Magnet Testing," it is not concerned with the design and use of thickness testers but rather with considerations involved in measurement of magnetic field strength. The whole book is theoretical rather than practical; designed for users who want to know how best to measure the performance of magnetic materials and to judge their suitability for particular applications. (From review in *Electroplating and Metal Finishing.)* (P16, S13, S14)

528-P. (Book.) Molybdenum Compounds; Their Chemistry and Technology. D. H. Killeffer and Arthur Linz. 407 pages. 1952. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Includes a chapter on structural chemistry of Mo, by Linus Pauling. Third chapter is devoted to physical, chemical, and mechanical properties of Mo itself. The chapter on Mo catalysts occupies about half of the book by virtue of its extensive indexed catalyst bibliography. (P general, Q general, Mo)

529-P. (Book.) The Oxidation States of the Elements and Their Potentials in Aqueous Solutions. Ed. 2. Wendell M. Latimer. 392 pages. 1952. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y.

Summary of existing data. Present edition includes more extensive thermodynamic data of special significance in interpretation of inorganic chemistry; potential diagrams for all elements which have more than one oxidation state; several hundred new values; and amplified treatment of U, Np, Pu, Am, and the actinide elements. Footnote references, extensive tables, and study questions. (P12, P13)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

837-Q. The Growth and Present State of Three-Dimensional Photoelasticity. M. M. Frocht. *Applied Mechanics Reviews,* v. 5, Aug. 1952, p. 337-340.

A review from the work of Oppel to the present time. Optical method of stress analysis may be viewed as a practical instrument capable of the exploration of the complete state of stress in general space problems. 43 ref. (Q25)

838-Q. The Performance of Hard Facing Welding Alloys. N. D. Berrick. *Australasian Engineer,* June 7, 1952, p. 54-59.

Wear and other factors involved, laboratory and service testing, and manufacture of hard facing rods and electrodes. Service results for a series of commercial examples. (Q9, T5, ST, SG-m)

839-Q. Stress-Probing: a Rapid Method for Stress-Surveying. Nicol Gross and P. H. R. Lane. *Engineering,* v. 174, July 25, 1952, p. 97-100.

New method for measurement of stresses in pressure vessels which is much cheaper and less time consuming than the strain-gage method, yet gives results in good agreement with the latter. A commercially produced measuring gage, based on change of helix angle of a perforated twisted strip, is used. Comparative results are charted. (Q25)

840-Q. Instrumentation for a Precision Creep-Testing Laboratory. Joe Lundholm, Jr. *Instruments,* v. 25, Aug. 1952, p. 1096-1101; *I.S.A. Journal,* v. 8, Aug. 1952, p. 94-99.

Described, diagrammed, and illustrated. (Q3)

841-Q. A Yield Criterion for Ductile Metals Based Upon Atomic Structure. Milton C. Shaw. *Journal of The Franklin Institute,* v. 254, Aug. 1952, p. 109-126.

A strength theory for ductile metals is presented that takes into account short range inhomogeneities present in all commercial metals. Examples illustrate the shortcomings of conventional maximum shear-stress and distortion energy theories that result from failure of these theories to recognize the inhomogeneous nature of metals. Shows why a size effect is observed with torsion specimens but not with tensile specimens of usual size. The size effect in fatigue testing and hardness testing by means of micro techniques. Relation of the new theory for ductile metals to the statistical theory of Weibull for brittle materials. 21 ref. (Q23)

842-Q. Materials for Springs for Use at Elevated Temperatures. *Mainspring,* v. 14, Aug. 1952, 4 pages.

Results of experimental study of various spring materials at temperatures from 250 to 700° F. Initial stress is plotted against per cent loss of load at various temperatures for oil tempered valve-spring wire, for SAE 6150 and 9254 steels, for Type 302 18-8 stainless, and for 18-4-1 high-speed steel. (Q23, AY, SS, TS, SG-b)

843-Q. Wear and Sliding Friction Properties of Nickel Alloys Suited for Cages of High-Temperature Rolling-Contact Bearings. I. Alloys Retaining Mechanical Properties to 600° F. II. Alloys Retaining Mechanical Properties Above 600° F. Robert L. Johnson, Max A. Swikert, and Edmond E. Bisson. *National Advisory Committee for Aeronautics,* Technical Notes 2758 and 2759, Aug. 1952, 30 and 29 pages.

Part I: Wear and sliding-friction properties of "L" nickel, wrought monel, cast monel, cast modified "H" monel, cast "S" monel, Invar, Ni-Resist 3, and Nichrome V in contact with hardened SAE 52100 steel. Part II: Properties of cast Be-Ni, heat treated Be-Ni, cast Inconel, Nimonic 80, Inconel X, Refractalloy 26, and Discaloy were studied in similar circumstances. Development of a naturally formed nickel oxide film produced good properties. Relative merits of the different materials. 22 ref. (Q9, Ni, CI, Fe, AY, SG-h)

844-Q. Surface Oxide Films in Intermetallic Contacts. M. Cocks. *Nature,* v. 170, Aug. 2, 1952, p. 203-204.

Bowden and Hughes have shown that removal of surface oxide films can endow metals with very high coefficients of friction. To examine to what extent these films, when present, prevent metallic contact, electrical resistance measurements were made on the loaded junction between crossed cylinders of various metals. Results are charted and discussed. (Q9, P15)

845-Q. Mechanical Properties of Thin Films of Silver. J. W. Beams, W. E. Walker, and H. S. Morton, Jr. *Physical Review,* ser. 2, v. 87, Aug. 1, 1952, p. 524-525.

Films of silver of uniform thickness were electrodeposited on small cylindrical steel rotors with rounded ends and the rotational speeds required to throw them off the rotors were measured. The rotors were spun in high vacuum. Tensile strength determined in this way is charted as a function of thickness. (Q general, Ag)

846-Q. Metal Transfer During Static Loading and Impacting. E. Rabinowicz. *Proceedings of the Physical Society,* v. 65, sec. B, Aug. 1, 1952, p. 630-640.

Experiments on pressing of a hemispherical slider into a flat metal surface show that metal fragments are transferred from one surface to another, and this shows that strong junctions are formed between metal surfaces in contact. Experiments were made using various similar and dissimilar metal

pairs. Lubricants were found to reduce size, not number of junctions. Diagrams, autoradiographs, micrographs. 10 ref. (Q9)

847-Q. The Creep of Metals Under Interrupted Stressing. A. J. Kennedy. *Proceedings of the Royal Society,* ser. A, v. 213, July 22, 1952, p. 492-506.

The creep behavior of polycrystalline Pb subjected to interrupted stress, or stress pulses, was examined with an apparatus which enables the creep curve to be recorded as a magnified photographic trace. When the metal is reloaded after an interruption, a new creep transient is exhibited which can be adequately expressed by assuming a fraction n of the material to have recovered its original Andrade β-flow properties, while the remaining fraction continues to deform as if unloading had not occurred. It is shown that this analysis is valid whether the material exhibits a finite Andrade k-flow or not. Variation of n with the time of creep previous to interruption, for a constant recovery time (R), and variation of n with R for a constant time were each investigated. 18 ref. (Q3, Pb)

848-Q. On Wear Properties of Spheroidal Graphite Cast Iron. Fusao Hayama. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 20-22.

Wear-test apparatus is diagrammed. Results are tabulated, charted and discussed for six microstructural types of cast iron. (Q9, CI)

849-Q. Studies on the Ternary System of the Al-Si-Zn Casting Alloy. Shigeo Oya. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 46-47.

Ternary diagrams show tensile strenth and Brinell hardness of Al-Si-Zn casting alloys, also effects of 0.5% Cr on these properties. (Q23, Q29, M24, Al)

850-Q. Impact Compression of Short and Long Column. Yuji Matsuura. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 62.

Results of experiments on square brass columns, compressed by a drop hammer. Graphs. (Q28, Cu)

851-Q. The Research for the Fatigue of Mild Steel by Etching. Hiroshi Yamanouchi and Takeshi Inukai. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 63-64.

Study of the mechanism of fatigue-crack initiation. The specimens were etched to reveal the microstructure in the neighborhood of crack inception. (Q7, CN)

852-Q. Theory of Mechanical Wear. J. F. Archard. *Research,* v. 5, Aug. 1952, p. 395-396.

Briefly discussed. (Q9)

853-Q. B. W. R. A. Fatigue Testing Laboratory. *Welding and Metal Fabrication,* v. 20, Aug. 1952, p. 289-292.

New laboratory of British Welding Research Assn. (Q7)

854-Q. (French.) **Notched-Bar Impact Test and Various Embrittling Factors.** Gilbert Remy. *Métaux: Corrosion—Industries,* v. 27, June 1952, p. 245-264.

Extensive analysis of experimental and theoretical work. Possibility of generalization of the laws of plastic deformation. Numerous graphs taken from the literature. 46 ref. (Q6)

855-Q. (French.) **Physical Principles of Creep.** P. Laurent. *Métaux: Corrosion—Industries,* v. 27, June 1952, p. 265-273.

Critically discusses literature on deformation by creep, behavior of metal during creep, and rupture by creep and their principles. Data from the literature are charted and tabulated. (Q3)

856-Q. (German.) **Hot Brittleness of Nickel-Chromium Steels.** Gustav Hoch. *Archiv für das Eisenhüttenwesen,* v. 23, July-Aug. 1952, p. 257-275; disc., p. 275-276.

Reviews various brittleness phenomena, with quantitative data on types of brittleness. In particular, brittleness occurring after prolonged annealing; experimental results of notch-impact and hot-tensile tests on Cr-Ni stainless steels. Data are tabulated and charted; micrographs. 14 ref. (Q23, SS)

857-Q. (German.) **Determination of Residual Stresses in Finished Pieces.** Hans Bühler. *Archiv für das Eisenhüttenwesen,* v. 23, July-Aug. 1952, p. 293-297.

Stress measurements done on steel cylinders by means of G. Sachs' drilling process. The effect of area of the end surface, and of length, upon results. Application of the method to hollow cylinders is proposed. Data are tabulated and charted. (Q25, ST)

858-Q. (German.) **Alternating Tension and Compression-Stress Fatigue Strength and Changes in the Properties of Steels After Various Rates of Cold Forming.** Hans-Rolf Sander and Max Hempel. *Archiv für das Eisenhüttenwesen,* v. 23, July-Aug. 1952, p. 299-320.

Details of experiments to complement data in the literature. Results of various tests. Tables, charts, micrographs and 54 ref. (Q7, ST)

859-Q. (German.) **The Creep Behavior of Some Nonferrous Metals and Their Alloys.** K. Löhberg. *Metall,* v. 6, Aug. 1952, p. 446-450.

Dependence of creep behavior of metals on fusion temperature and lattice structure. Results of experiments on Pb, Cu, Al, Mg, Zn, and their alloys are charted. (Q3, Pb, Cu, Al, Mg, Zn)

860-Q. (German.) **The Applicability of Technical Methods of Measuring Internal Stresses in Metallic Workpieces.** Hans Bühler. *Stahl und Eisen,* v. 72, July 31, 1952, p. 947-952.

Different measuring methods developed using specimens of ring, disk or strip shape and their applicability. Advantages and disadvantages of stress measurements on cores bored out of solid and hollow workpieces. Application of extension measurement strips for measuring total internal stresses in solid and hollow cylinders. 29 ref. (Q25)

861-Q. (German.) **Brittle Fracture of Crystallized Substances as a Surface Phenomenon.** M. Schreckenbach. *Technik,* v. 7, Feb. 1952, p. 65-73.

Inadequacy of orthodox explanation of brittle fracture. Such fracture occurs when the energy required to form a fracture surface is available in a plastically transmittable manner, and fracture occurs as soon as this energy has become great enough. 60 ref. (Q26)

862-Q. (German.) **Research on the Bursting Strength of Safety Discs.** Hans Biegler. *Technik,* v. 7, Feb. 1952, p. 74-76.

Research results on pressure and temperature safety disks. Stressed and ruptured disks of various materials, including gray cast iron, are illustrated. (Q26, CI)

863-Q. (German.) **Fatigue Fractures Within the "Shrink-Fit" Connections of Crankshafts.** K. Gleitz. *Technik,* v. 7, Mar. 1952, p. 107-112.

Correct designs of crankshafts to prevent fractures and the possibility of repairing cracked shafts by thermit welding. Diagrams, photographs, tables, and photomicrographs. (Q7, K4, ST)

864-Q. (German.) **Computation and Experimental Testing of the Strength Properties of Automotive Parts.** Heinz Glaubitz. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, July 21, 1952, p. 715-719.

Strength properties of individual stressed automobile parts and testing methods. Charts and graphs. 25 ref. (Q23)

865-Q. (Russian.) **Stress and Deformation During Cyclic Loading.** Iu. N. Rabotnov. *Prikladnaia Matematika i Mekhanika,* v. 16, Jan.-Feb. 1952, p. 121-122.

A brief mathematical analysis. (Q27)

866-Q. Creep-Rupture and Recrystallization of Monel From 700-1700° F. Nicholas J. Grant and Albert G. Bucklin. *American Society for Metals,* Preprint 5, 1952, 20 pages.

Extensive creep-rupture tests were made on wrought Monel at temperatures from 700-1700° F. and for rupture times from about 0.001 to 2700 hr. Tests were made on annealed, 30% cold worked, and 75% cold worked structures. Recrystallization data were obtained for Monel cold worked from 4 to 70% and annealed from 0.5 to 500 hr. at temperatures from 800 to 1700° F. Correlation of recrystallization data from static tests with hardness changes and equicohesion values from stress-rupture tests was attempted. Experimentally determined values of equicohesion are given for 30% cold worked Monel. (Q4, N5, Ni)

867-Q. Influence of Grain Size on High Temperature Properties of Monel. Paul Shahinian and Joseph R. Lane. *American Society for Metals,* Preprint 6, 1952, 22 pages.

Specimens of two heats were tested in creep-rupture at 700, 900, 1100, and 1300° F. and at stresses ranging from 7000 to 65,000 psi. Grain sizes, which ranged from 0.024 to 0.78 mm. average diameter were obtained by cold work and recrystallization. Time-to-rupture, minimum creep rate, total elongation, and reduction-in-area curves were drawn showing their relationship to grain size. 16 ref. (Q3, Q4, Ni)

868-Q. Creep and Rupture of Chromium-Nickel Austenitic Stainless Steels. E. J. Dulis, G. V. Smith, and E. G. Houston. *American Society for Metals,* Preprint 7, 1952, 35 pages.

Creep and rupture test data for AISI Grades 304L, 304L (high N) 316L, 316-Cb, and 303; test results of additional heats of 304, 321, and 347. Changes in microstructure and in certain room-temperature mechanical properties brought about by creep-test exposure. (Q3, Q4, M27, SS)

869-Q. Temperature Dependence of the Hardness of Pure Metals. J. H. Westbrook. *American Society for Metals,* Preprint 17, 1952, 23 pages.

The literature covering the hardness of pure metals as a function of temperature is reviewed and some generalizations made. These led to an approximate method for calculating hardness of a pure metal as a function of test temperature, crystal structure, specific heat, and heats of fusion and transformation. The method has approximate validity from near absolute zero to about half the absolute melting point. 50 ref. (Q29)

870-Q. Hardness of Various Steels at Elevated Temperatures. F. Garofalo, P. R. Malenock, and G. V. Smith. *American Society for Metals,* Preprint 18, 1952, 18 pages.

A hot hardness tester of the static-loading type and testing techniques. A number of different steels, including various types of 18 Cr, 8 Ni stainless, plain carbon steels and an 8 Cr + 1 Mo steel, were tested at temperatures ranging from room temperature to 1500° F. The results

indicate a general relation between hot hardness and creep or creep-rupture strength, which, to a first approximation, is independent of structure or test temperature. A similar relation was observed between hot hardness and ultimate tensile strength in short-time hot tensile tests. 16 ref. (Q29, SS, AY)

871-Q. Some Properties of a Nodular Iron at Elevated Temperatures. M. S. Saunders and M. J. Sinnott. *American Society for Metals,* Preprint 19, 1952, 12 pages.

Short-time tensile data over the range 800-1200° F. for a typical nodular iron in two conditions: as-cast and partially annealed. Elevated-temperature impact data for various exposure times over the same range. Stress-rupture data at 1200° F. for the iron in both conditions. Comparison with the same properties of killed carbon steel and with C-Mo steel. (Q27, Q6, Q4, CI)

872-Q. Accelerated Strain Aging of Commercial Sheet Steels. L. R. Shoenberger and E. J. Paliwoda. *American Society for Metals,* Preprint 20, 1952, 15 pages.

Effect of natural strain aging on hardness and tensile characteristics of some rimmed and stabilized steels. Variations in behavior of rimmed steels are ascribed principally to ferrite grain size and degree of skin rolling. In strain aging of Al-killed and vanadium rimmed steels, the N not combined with Al or V assumes an important position as shown by its relationship to proportional-limit changes. An accelerated strain-aging test using gradient heating was developed to predict the course of age hardening and to estimate rate and severity of yield-point return during aging. 11 ref. (Q27, N7, CN)

873-Q. X-Ray Measurement of Residual Stress in Hardened High-Carbon Steel. A. L. Christenson and E. S. Rowland. *American Society for Metals,* Preprint 22, 1952, 29 pages.

X-ray method for measurement of macro or engineering stress in hardened high-carbon steel. The method is applied to measurement of O.D. surface stress in carburized and hardened rings of SAE-4620 steel with heat treated, ground, and electrolytically polished surfaces. (Q25, AY)

874-Q. The Endurance Limit of Temper-Brittle Steel. R. D. Chapman and W. E. Jominy. *American Society for Metals,* Preprint 23, 1952, 12 pages.

Investigation of effect of temper brittleness of an SAE 5140 steel on endurance limit at both room temperature and at 35° F. Three different heat treatments were applied. Both polished and notched bars were tested in fatigue at room and subzero temperatures. In addition, tensile and standard V-notch Charpy impact specimens were tested at the same temperatures. 15 ref. (Q7, AY)

875-Q. Plastic Stress-Strain Relations of Alcoa 14S-T6 for Variable Biaxial Stress Ratios. Joseph Marin, L. W. Hu, and J. F. Hamburg. *American Society for Metals,* Preprint 24, 1952, 22 pages.

Three types of biaxial stress tests were conducted: constant-stress-ratio tests and two types of variable-stress-ratio tests. Main object of the study, however, was not to report on the constant-stress-ratio tests, but to determine validity of the flow-type theory in predicting plastic stress-strain relations under combined stresses. Data are charted and tabulated. (Q27, Al)

876-Q. The Effect of Various Heat Treating Cycles Upon Temper Brittleness. L. D. Jaffe, D. C. Buffum, and F. L. Carr. *American Society for Metals,* Preprint 25, 1952, 7 pages.

Material from one heat of SAE 3140 steel was quenched and tempered. Portions were subjected to 20 different temper-embrittlement cycles involving slow and rapid heating and cooling, with and without isothermal holding at one temperature. Temperature of transition from tough to brittle fracture in the V-notch Charpy test was determined after each treatment. (Q23, J26, AY)

877-Q. Effect of Hardness on the Level of the Impact Energy Curve for Temper Brittle and Unembrittled Steel. Frank L. Carr, Manuel Goldman, Leonard D. Jaffe, and Donald C. Buffum. *American Society for Metals,* Preprint 26, 1952, 5 pages.

Specimens of martensitic SAE 3140 steel were tempered for short times at several temperatures between 500 and 675° C. to give various hardnesses ranging from Rockwell C-20½ to C-38. Comparisons of energy levels in the V-notched Charpy test were made at 200° C. above the temperature of transition from ductile to brittle failure. A linear relationship between impact-energy level and hardness was found in the hardness range Rockwell C-27 to at least C-38. (Q6, Q29, AY)

878-Q. Transverse Mechanical Properties in an SAE 1045 Forging Steel. Arthur H. Grobe, Cyril Wells, and Robert F. Mehl. *American Society for Metals,* Preprint 27, 1952, 34 pages.

Tensile-test data for specimens from a high-quality SAE forging steel were accumulated and analyzed statistically. Specimens were cut from the original ingot and from forgings reduced 2 to 1, 4 to 1, and 10 to 1. Approximately 60 transverse or 10 longitudinal values per each property investigated constituted a sample. The investigation included a study of tensile properties associated with two pearlite and ferrite structures—annealed and air-cooled—and four quenched and tempered structures—quenched to martensite and tempered at 750, 950, 1100, and 1250° F. Effect of angle of test from transverse to longitudinal direction on tensile properties was determined for 10-1 reduction for specimens in the annealed and quenched and tempered state. Tensile-test data are presented for commercial forgings. (Q27, CN)

879-Q. The Determination of the Elastic Constants of Metals by the Ultrasonic Pulse Technique. Myron B. Reynolds. *American Society for Metals,* Preprint 28, 1952, 15 pages.

Technique was used to determine Young's modulus, shear modulus, and Poisson ratio of Be, Cb, Zr, Ti, V, Th, U, α-brass, and Type 347 stainless steel. Relationships between elastic wave velocities and elastic constants are given for the case of an isotropic solid. Elastic wave propagation and reflection are treated briefly. Technique and apparatus and computation of wave velocities. Elastic moduli obtained are tabulated and discussed. (Q21, Be, Cb, Zr, Ti, V, Cu, SS)

880-Q. Mechanical Properties and Strain Aging Effects in Titanium. R. D. Rosi and F. C. Perkins. *American Society for Metals,* Preprint 29, 1952, 20 pages.

Tensile properties of Ti of commercial purity were investigated between 77 and 925° K. at constant strain rates of 0.003 and 0.138 min. Results of these tests showed that this material exhibits the usual mechanical effects associated with strain aging. Some observations were made on the nature of Lüders' bands in an extended, coarse-grained sheet specimen. 16 ref. (Q27, Ti)

881-Q. Mechanical Properties, Including Fatigue, of Titanium-Base Alloys RC-130-B and Ti-150-A at Very Low Temperatures. S. M. Bishop, J. W. Spretnak, and M. G. Fontana. *American Society for Metals,* Preprint 31, 1952, 14 pages.

The alloys were subjected to tensile, fatigue, impact, hardness, and dilatometric tests at low temperatures. Data are reported for tensile and fatigue at 77, -108, and -321° F.; impact and hardness at 77, -108, -197, -321 and -423° F.; and expansion from room temperature to -321° F. Apparatus and techniques. (Q general, Ti)

882-Q. A Study of the Mechanism of the Delayed Yield Phenomenon. T. Vreeland, Jr., D. S. Wood, and D. S. Clark. *American Society for Metals,* Preprint 33, 1952, 13 pages.

Experimental investigation of behavior of an annealed low-carbon steel subjected to a rapidly applied constant stress and to repeated short-duration stress-pulses. Effect of time of aging on number of stress-pulses to induce yielding was determined. Effects observed are discussed in terms of the dislocation theory of yielding. 16 ref. (Q23, CN)

883-Q. Properties of Some Hydrogen-Sintered, Binary Molybdenum Alloys. W. L. Bruckhart, M. H. LaChance, C. M. Craighead, and R. I. Jaffee. *American Society for Metals,* Preprint 36, 1952, 25 pages.

From a study conducted on alloys representing 18 different binary types, data are presented showing effects of these additions on fabricability, room-temperature mechanical properties, and hot hardness to 800° C. Results indicate that Al, Co, Cr, Fe, Si, and W are the most effective alloying additions. (Q general, Mo)

884-Q. The Effect of Dispersions on the Tensile Properties of Aluminum-Copper Alloys. R. B. Shaw, L. A. Shepard, C. D. Starr, and J. E. Dorn. *American Society for Metals,* Preprint 37, 1952, 23 pages.

The plastic properties were correlated with mean free path between the hard $CuAl_2$ particles dispersed in the α solid solution phase. True stress-true plastic strain curves for the various dispersions formed a homologous series, yield strength and the rate of strain hardening increasing uniformly with decreasing mean free path. These results were found to be valid from 78 to 295° K. and for compositions of 3, 4, and 5% Cu in high-purity Al. (Q27, Al)

885-Q. Some Properties of High Purity Zirconium and Dilute Alloys With Oxygen. R. M. Treco. *American Society for Metals,* Preprint 38, 1952, 19 pages.

A systematic investigation of the physical and mechanical properties of dilute alloys of oxygen in high-purity iodide-refined Zr. A marked strengthening effect was observed as a result of O_2 additions. Results of tensile tests at elevated temperatures up to 400° C. Preparation of alloys. 14 ref. (Q general, P general, Zr)

886-Q. Intercrystalline Cracking of Metals. J. Neill Greenwood. *Bulletin of the Institute of Metals,* v. 1, Aug. 1952, p. 104-105. (Bound with *Journal of the Institute of Metals,* v. 80, Aug. 1952.); *Journal of the Iron and Steel Institute,* v. 171, Aug. 1952, p. 380.

A model is used as an aid in explaining mechanism of intercrystalline cracking. Conditions necessary appear to be increased temperature and decreased rate of strain. (Q23)

887-Q. Cross-Slip in Aluminium and α-Brass. Robert Maddin. *Bulletin of the Institute of Metals*, v. 1, Aug. 1952, p. 105-106. (Bound with *Journal of the Institute of Metals*, v. 80, Aug. 1952.)

Summarizes previous findings. Micrographs. (Q24, Al, Cu)

888-Q. Low-Stress Torsional Creep Properties of Pure Aluminium. *Bulletin of the Institute of Metals*, v. 1, Aug. 1952, p. 106-108. (Bound with *Journal of the Institute of Metals*, v. 80, Aug. 1952.)

Two Letters to the Editor (by T. Ll. Richards and D. E. Yeomans, and by A. J. Kennedy) critically discuss some recent results reported in the literature. Kennedy points out that the results reported are not irreconcilable with the behavior of fairly simple models. Graphs. 10 ref. (Q3, Al)

889-Q. The Effect of Water Corrosion and Shot Peening on Fatigue Strength of Mining Drill Rods. T. W. Wlodek. *Canadian Mining and Metallurgical Bulletin*, v. 45, Aug. 1952, p. 470-477; disc., p. 477-478; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, 1952, p. 292-299; disc., p. 299-300.

Results of research into the fatigue properties of SAE 1080 carbon steel and low-alloy Ni-Cr-Mo steel for mining drill rods. Eight S-N curves for as-rolled and shot-peened mining drill rods under both dry and water corrosion conditions were derived—their shape and relative position. Features relating to field performance of the drill rods. (Q7, G23, R4, CN, AY)

890-Q. Physical and Mechanical Properties and Specifications for Magnesium Alloys. J. C. McDonald. *Engineer Research and Development Laboratories* (Ft. Belvoir, Va.), "The Magnesium Symposium", Feb. 9, 1951, p. 7-19.

(Q general, S22, Mg)

891-Q. Design for Magnesium Castings and Forgings. George L. Moore. *Engineer Research and Development Laboratories* (Ft. Belvoir, Va.), "The Magnesium Symposium", Feb. 9, 1951, p. 21-35.

Choice of manufacturing process, alloy, and heat treatment; dimensional details of the design; fatigue, creep, and impact properties. (Q general, E general, F22, Mg)

892-Q. Metals Can Be Softened By Cold Work. N. H. Polakowski. *Iron Age*, v. 170, Aug. 28, 1952, p. 106-111.

See abstract of "Softening of Metals During Cold Working", *Journal of the Iron and Steel Institute*, item 154-Q, 1952. (Q24, N5, Cu, Ni, Al, ST)

893-Q. Austenitic Cast Stainless Good for Low Temperature Applications—But. J. W. Juppenlatz. *Iron Age*, v. 170, Sept. 4, 1952, p. 147-151.

Shows that a full austenitic structure or low magnetic permeability is not a guarantee of high impact strength at low temperatures. Although welding of some grades does not seriously affect low-temperature properties, post-weld solution treatment is shown to be advisable for improved corrosion resistance. Comparative mechanical properties are charted. (Q6, R general, SS)

894-Q. How Good is the Charpy Impact Test? C. A. Penrose. *Iron Age*, v. 170, Sept. 11, 1952, p. 143-147.

To determine reliability of the Charpy test and its reproducibility, steels of 150,000-160,000 psi. yield strength, having impact strength of 20-30 ft.-lb. were tested at −40° F. Within these limits and only for this set of conditions the Charpy "V" notch test is reliable. Photomicrographs, diagrams, and tables. (Q6, ST)

895-Q. Anelasticity of Zinc. Shuichiro Takhashi. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 866-868.

Investigation using bars vibrating transversely at audio frequencies in the "free-free" modes. With these specimens, a discontinuous phenomenon which is supposed to be closely correlated with slips occurring in the crystal was found. (Q22, Zn)

896-Q. Twin Accommodation in Zinc. P. L. Pratt and S. F. Pugh. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 653-658.

A study of plastic deformation of single crystals of Zn, using opaque-stop and X-ray microscopic techniques to examine cleavage faces. Stresses arising from twinning shear are shown to be relieved by accommodation kinking. Diagrams. 10 ref. (Q24, Zn)

897-Q. The Creep and Softening Properties of Copper for Alternator Rotor Windings. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 682-683.

Discussion of paper by N. D. Benson, J. McKeown, and D. N. Mends. See item 10-Q, 1952. (Q3, Cu)

898-Q. Factors Influencing the Creep Resistance of Wrought Carbon Steels. C. H. M. Jenkins and H. J. Tapsell. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 359-371.

Summarizes work on creep properties of carbon steels carried out for the Electrical Research Assn. at the National Physical Laboratory between 1929 and 1948. Influence of a number of manufacturing variables and other metallurgical factors on the creep rate, with particular reference to steels having abnormally high creep rates. Tables, graphs, photomicrographs. 22 ref. (Q3, CN)

899-Q. Influence of Chemical Composition on the Rupture Properties at 1200° F. of Wrought Cr-Ni-Co-Fe-Mo-W-Cb Alloys. E. E. Reynolds, J. W. Freeman, and A. E. White. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 946-958.

Investigation results for 63 modifications of Cr-Ni-Co-Fe-base alloys at 1200° F. Melting, fabrication, and heat treatment were kept constant. Micrographs, tables, and graphs. 17 ref. (Q26, Cr, Ni, Co, Fe)

900-Q. Creep Correlations in Alpha Solid Solutions of Aluminum. Oleg D. Sherby and John E. Dorn. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952; p. 959-964.

Materials, equipment, technique, results, and validity of results of study to determine secondary creep rates and temperatures for correlations between creep and tensile data on basis of the Zener-Hollomon relationship. Diagrams and tables. 11 ref. (Q3, Al)

901-Q. Some Observations of Subgrain Formation During Creep in High Purity Aluminum. Italo S. Servi, John T. Norton, and Nicholas J. Grant. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 965-971.

Coarse-grained high-purity aluminum was tested in creep at temperatures of 400-1200° F. to develop subgrain structures. Measurements of subgrain size, distribution and rotation were made from X-ray diffraction patterns. Micrographs and tables. 20 ref. (Q3, Al)

902-Q. Fatigue Tests at High Temperatures. *Metal Progress*, v. 62, Sept. 1952, p. 152, 154. (Condensed from "Hot Fatigue Testing", H. E. Gresham and B. Hall, *Iron and Steel Institute*). "Symposium on High-Temperature Steels and Alloys for Gas Turbines."

Previously abstracted from original. See item 510-Q, 1951. (Q7)

903-Q. Recent European Work on the Mechanical Properties of Metals at Low Temperatures. N. P. Allen. *National Bureau of Standards*, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 1-34; disc., p. 34-35.

Elasticity and plasticity, and development of brittleness at low temperatures, in relation to brittle fracture in mild steel, behavior of heat treated alloy steels at temperatures prevailing in the stratosphere, and reliability of austenitic steels at liquid-air temperature. Properties at low temperatures of pure alloys of iron made at the National Physical Laboratory. Some alloying additions exert influence on resistance to plastic deformation. 29 ref. (Q general)

904-Q. Development and Application of Chromium-Copper-Nickel Steel for Low-Temperature Service. Walter Crafts and C. M. Offenhauer. *National Bureau of Standards*, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 48-63; disc., p. 63-66.

An economical low-alloy Cr-Cu-Ni steel designed for service at low temperatures has been used successfully for many years in chemical plant fabrication and has consistently been suitable for use at −80° C. Several heats have been applied at −100° C. Experimental studies under laboratory conditions and observations of commercial heats suggest that a most significant and immediately applicable improvement would result from increase in the Al content above the amount required for grain refinement to a level of 0.10-0.20%. Mechanical properties are tabulated and charted. (Q general, T29, AY)

905-Q. Tensile Properties of Copper, Nickel, and Some Copper-Nickel Alloys at Low Temperatures. Glenn W. Geil and Nesbit L. Carwile. *National Bureau of Standards* "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 67-93; disc., p. 93-96.

Tension tests were made at −196, −140, −78, −30, +25 and +100° C. on high-conductivity Cu, cupronickel, 70% Ni +30% Cu alloy, and Ni in the annealed condition. True stress-strain curves were determined from numerous simultaneous load and diameter measurements made during the course of each test to fracture. Graphs show influence of test temperature and chemical composition on mechanical properties and work hardening characteristics. Effect of solute content of the alloys on initial strength, ultimate tensile stress, and on true stress and true strain at maximum load and at fracture. 14 ref. (Q27, Cu, Ni)

906-Q. Application of Metals in Aircraft at Low Temperatures. J. B. Johnson and D. A. Shinn. *National Bureau of Standards*, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 97-109; disc., p. 109-111.

Relationship of properties of metals as determined by conventional laboratory tests and those selected by designer. Tests of aircraft metals at temperatures down to −420° F. Recommends that evaluation of serviceability of material at low temperatures not be based on transition from tough to brittle fracture as represented by results of notched-bar impact tests, as this may mean selection of steel with a higher content of strategic alloying elements than is necessary for the specific application. 14 ref. (Q23, T24)

907-Q. Properties of Austenitic Stainless Steels at Low Temperatures. V. N. Krivobok. *National Bureau of Standards,* "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 112-134; disc., p. 135-136.

Study and summary of published and unpublished information on strength characteristics of austenitic stainless steels at various subzero temperatures. Effect of composition on mechanical properties at room and subzero temperatures, calculations of true strength from test results, and influence of heat treatments, especially those that might result either in carbide precipitation or sigma formation, on mechanical properties at low temperatures. The beneficial influence of extra low carbon content. Data on modulus of elasticity, fatigue, impact, tensile impact, effect of notches, distribution of ductility at the notch, and the beneficial effects of low temperature on ductility characteristics. 18 ref.
(Q general, SS)

908-Q. Dimensional Effects in Fracture. C. W. MacGregor and N. Grossman. *National Bureau of Standards,* "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 137-150; disc., p. 150-152.

Previously abstracted from *Welding Journal;* item 166-Q, 1952.
(Q26, TS)

909-Q. Mechanical Properties of High-Purity Iron-Carbon Alloys at Low Temperatures. R. L. Smith, G. A. Moore, and R. M. Brick. *National Bureau of Standards,* "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 153-179; disc., p. 179.

Natural stress-strain data were obtained at temperatures from 23 to −185° C. on four high-purity Fe-C alloys containing 0.05-0.49% C. Conclusions resulting from analysis of the data. (Q27, Fe)

910-Q. Brittle Fractures in Ship Plates. Morgan L. Williams. *National Bureau of Standards,* "Mechanical Properties of Metals at Low Temperatures",Circular 520, 1952, p. 180-204; disc., p. 204-206.

Principal factors contributing to structural failures of welded ships and preventive measures that have been applied. Statistical interpretation of data obtained from laboratory investigations of 113 plates removed from fractured ships indicates that probability of fracture starting in plate increases markedly with increasing notch sensitivity as measured by the 15 ft. lb. transition temperature of Charpy V-notch specimens. 12 ref. (Q26, CN)

911-Q. A Torsion Pendulum of Improved Design for Measuring Damping Capacity. James W. Jensen. *Review of Scientific Instruments,* v. 23, Aug, 1952, p. 397-401.

Construction of equipment with an improved method of alignment which minimizes friction losses. (Q8)

912-Q. Sub-Zero Strain Aging Affects Iron Properties. *Steel,* v. 131, Sept. 1, 1952, p. 86-87.

Relative proportions of strain aging and hardening at the various temperatures for five conditions of ingot iron were determined on basis of known tendencies of two types of work hardening to increase or decrease these properties with temperature. (Q27, Fe)

913-Q. Ship Structural Members. Part V. A. G. Hadjispyrou and H. Lackenby. *Transactions of the Institution of Engineers & Shipbuilders in Scotland,* v. 95, pt. 7, 1951-52, p. 563-598; disc. p. 598-608.

Results of investigations on strength and stiffness include tests on rolled steel sections 9 and 12 in. in depth, in association with plating. Effect of the following variables: Various shapes of section both riveted and welded; different types and sizes of end connections both bracketed and unbracketed; cutting of scallops of different depths in the webs of welded stiffeners; and cutting of slots in the webs of riveted stiffeners. (Q23, CN)

914-Q. The Influence of Silicon in Aluminium on Life of Cutting Tools. Hans Lindqvist. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

A study of the wear of toolsteel when used on four Al-base alloys containing 0.35% Mg and 5, 10, 12.5, and 21% Si. Graphs and diagrams. (Q9, G17, TS, Al)

915-Q. Mechanical Properties and Applications of Sintered Parts. H. G. G. Zapf. 4th International Mechanical Engineering Congress, June 1952, 16 pages.

Deals with structural parts. Mechanical properties and production method; classification of sintered products; alloying techniques; and subsequent treatments. Mechanical and physical properties of Fe and brass parts, especially in relation to production methods; mechanical properties of Cu and C steels; Fe-Cu equilibrium; etc. Photographs, tables, and diagrams.
(H general, Q general, Fe, Cu)

916-Q. Testing of Heavy Forgings for Steam Turbine Sets by Means of Core-Drilled Rods. R. Schinn. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Quality requirements of rotors which undergo a 2-min. spin test at 3750 r.p.m. Position of test samples in the forging. Special importance of above test-rods. Ultrasonic testing. Development of forging methods. Influence of carbon segregation. Flakes. Strength of rotor core. Testing results of 15 rotors with data on mechanical properties. Hardenability tests. Microstructure. Photographs, diagrams, and tables. (Q general, T25, F22, J26, S13, M27, AY)

917-Q. Some New Methods of Static Extensometry. H. de Leiris. *Microtecnic* (English Ed.), v. 6, Sept. 1952, p. 155-164. (Translated from the French.)

Treatment of problems of stress measurement and particularly their static aspect, limited to a description of some methods and their justification. Diagrams and photographs. 12 ref. (Q27)

918-Q. Small Brinell, Rockwell and Vickers Hardness Tester. *Microtecnic* (English Ed.), v. 6, Sept. 1952, p. 184-185.

For precision machines and measuring instruments. Table and photographs. (Q29)

919-Q. (Dutch) **Copper and Copper Alloys. 8. The Mechanical Properties of Refined Copper.** W. G. R. De Jager. *Metalen,* May 15, 1952, p. 164-165; June 15, 1952, p. 196-197; July 15, 1952, p. 228-230; Aug. 15, 1952, p. 256-257.

The properties of cast Cu as compared to rolled and molded Cu. Effects of cold and hot working. Graphs. (Q general, Cu)

920-Q. (Dutch.) **The Hardness of Metals.** M. J. Druyvesteyn and M. A. Meyer. *Metalen,* v. 7, June 30, 1952, p. 203-206; July 15, 1952, p. 220-222.

Discussion of commonly used hardness numbers (Brinell, Meyer, Vickers, and Rockwell). Their interpretation and dependence on the true stress-strain curve of the metal to be tested. Effect of cold work. Hardness of single-phase alloys, with new experimental results on some Ni alloys. Factors determining the hardness of heterogeneous alloys, both annealed and chill-cast. 26 ref. (Q29)

921-Q. (French.) **Improved Basic Bessemer Steel.** Robert Langers. 4th International Mechanical Engineering Congress, June 1952, 13 pages.

A special bessemer steel blown with a mixture of oxygen and superheated steam, and refined by use of a soda slag was found equivalent to openhearth steel. Tests showed excellent suitability for cold working plus notable strain-aging resistance. Hardening by cold working, which results in an increase of brittleness, was generally less pronounced for oxygen-steam-blown double-slag treated bessemer steel, than for openhearth steel. Mechanical properties graphed.
(Q general, D3, ST)

922-Q. (French.) **Light Alloys for Use at Elevated Temperatures.** J. Valeur. 4th International Engineering Congress, June 1952, 17 pages.

Experimental data obtained in the search for new alloys with better high-temperature mechanical properties. Metals mentioned are Al, Cu, Mg, Ni, and Zr. Compares cast and wrought forms. Tables.
(Q general, SG-h)

923-Q. (German.) **Relationship of Test Results on Materials to Behavior of the Structural Part Under Service Conditions and on Its Characteristics During Shaping.** E. Siebel. 4th International Mechanical Engineering Congress, June 1952, 7 pages.

Ultimate stress values, creep behavior, toughness, such technological properties as resistance to wear, and deformability in relation to noncutting shaping. Graphical data from the literature on soft iron and ingot steel. (Q general, Fe, ST)

924-Q. (German.) **Results of Creep Tests on Steels at 500° up to 100,000 Hours.** K. Richard. 4th International Mechanical Engineering Congress, June 1952, 31 pages.

Appearance and cause of brittle fractures at elevated temperatures. Long-time rupture tests. Long-time tensile strength and notch sensitivity of 11 steel types. Modification of testing steels for high-temperature service. Long-time yield limit, long-time damage limit, and long-time tensile-strength values for defining the properties of high-temperature materials. Graphitization. Damage to steels for high-temperature service caused by static load, and possibilities of their regeneration. Tables, graphs, and diagrams. 15 ref.
(Q3, AY, SS, SG-h)

925-Q. (German.) **Photo-Elastic Investigation of New Girder Shapes Welded From Sheet Metal.** R. Albrecht. *Schweissen und Schneiden,* v. 4, Aug. 1952, p. 277-279.

Description and diagrams. Results are tabulated; their practical application. (Q25, CN)

926-Q. (German.) **Discussion of Fatigue Strength of Notched Pieces.** M. Russenberger. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 18, July 1952, p. 220-227.

Fundamental analysis of design of pieces having elements which reduce strength, such as threads, holes, sharp corners, as well as inclusions, which have a similar effect. Shows that damping is responsible to a large extent for notch sensitivity. Characteristics of the damping, and especially its variability during the fatigue stressing. (Q7)

927-Q. (German.) **Stress-Optical Investigation of Plates by a Two-Layer Process.** A. Kuske. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Aug. 1, 1952, p. 745-747.

A modification of the photo-elastic method of determining bending stresses of plates. Photographs and graphs. 19 ref. (Q25)

928-Q. (German.) **The High Ductility State of Aluminum-Zinc-Base Alloys. Part II.** Heinz Mitbauer and Franz Sauerwald. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 244-249.

The relationships between ductility and segregation effects of conditions of casting and of degree of dispersion upon ductility, the β_3 disintegration, and physical properties were investigated at low temperatures. Proposes an interpretation of the origins of high ductility. Data are tabulated and charted. Micrographs. (Q23, Al, Zn)

929-Q. (Japanese.) **On the Theory and Its Application of Two-Dimensional Plasticity.** Yoshiaki Yamada. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, No. 5, Feb. 1951, p. 151-168.

The problem of plastic flow as a plane, or two-dimensional, problem of mathematical plasticity. A general method of solving the plane problem of plastic flow. Various types of slip lines and their features. Some examples of application of the mathematical theory of plasticity to plastic working of metals in manufacturing processes, such as wiredrawing, rolling, extrusion, and ironing of metal cups. (Q24, F general)

930-Q. (Japanese.) **Studies on Zinc-Base Die-Casting Alloys.** Masao Kato. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, No. 9, Mar. 1951, p. 274-303.

The alloy systems used so far universally as Zn-base die-casting alolys are Zn-Al and Zn-Al-Cu. Since Cu-containing alloys have the disadvantage of embrittlement due to aging, more attention should be given to Zn-Al alloys. Results of a comprehensive study on mechanical properties and corrosion resistance of the different compositions, including effects of impurities such as Pb, Cd, Mg, and Fe. Similar experiments were made on permanent-mold and die castings. Solution attack of the molten alloys on ferrous metals was also studied. Graphs and micrographs. 30 ref. (Q general, R general, Zn, Fe)

931-Q. (Russian.) **Equations of the Theory of Plasticity in Relationship to Temperature Changes.** N. S. Fastov. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 67-70.

A mathematical discussion. (Q23)

932-Q. High Strength Light Alloys. P. G. Giles and P. F. Kiddle. *Aircraft Engineering*, v. 24, Sept. 1952, p. 265, 273.

Problems arising from use of Al-Zn-Mg-Cu and duralumin-type alloys including stress, strain, loss of ductility, and aging. Tables and graph. (Q23, Al)

933-Q. The Design of Flexible Disk Misalignment Couplings. P. H. W. Wolff. *Institution of Mechanical Engineers, Proceedings* (Applied Mechanics Div.), v. 165, W.E.P. 67, 1951, p. 165-174; disc., p. 174-175.

Results of calculations to determine the increase in operating range of a disk coupling with skew misalignment which would be obtained by tapering the disks. Results concerning the stresses due to "umbrella" deflections, the vibration frequencies of tapered disks, and the torque buckling of disks of constant thickness are also presented. All results were obtained by integration of the general differential equation for disk bending. Photographs and graphs. (Q23, ST)

934-Q. Extension of the Simple Plastic Theory to Take Account of the Strain-Hardening Range. J. W. Roderick and J. Heyman. *Institution of Mechanical Engineers, Proceedings* (Applied Mechanics Div.), v. 165, W.E.P. 67, 1951, p. 189-197.

Experiments in which four steels were tested for tension and stress-strain relations through the plastic range. Information gave support to theoretical work, in which behavior of these steels in flexure can be correlated with the tensile properties. Diagrams, graphs, and tables. (Q27, ST)

935-Q. New Magnesium Alloy. *Metal Industry*, v. 81, Aug. 29, 1952, p. 169-170.

Mechanical properties are tabulated and graphed for Magnesium Elektron Limited's new alloy, Elektron ZT1. It is a Mg-Zr-Zn-Th alloy recommended for use in castings for the range 250-350° C. It was developed for jet engines and has high creep and fatigue resistance. (Q general, T25, Mg, SG-h)

936-Q. Economy of Steel. J. F. Baker and B. G. Neal. *Research*, v. 5, Sept. 1952, p. 412-418.

Behavior of structures in the plastic range (i.e. preceding collapse) can be used in developing a direct method of design based on calculation of collapse load. Where strength of structure is the sole design criterion, economy can be achieved by application of the plastic methods. Diagrams and graphs. 14 ref. (Q23, ST)

937-Q. High-Duty Irons Reduce Costs. C. E. Herington. *Steel*, v. 131, Sept. 15, 1952, p. 94-96.

Advantages of high-strength irons with respect to wear resistance, ability to stand up under heat, and ability to withstand repeated impact. Applications in rolls, dies, and jigs. (Q23, CI)

938-Q. The Creep of Some Non-Ferrous Metals and Their Alloys. K. Löhberg. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Previously abstracted from *Metall;* see item 859-Q, 1952. (Q3, Pb, Cu, Al, Mg, Zn)

939-Q. Origination and Prevention of Flow Lines in the Drawing of Brass and Nickel-Silver Hollow Ware. R. Ergang. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Includes discussion of flow-lines in steel, iron, and brass; survey of tension-dilatation-curves of brass and nickel silver with simultaneous, subjective observation of stretcher-strains; and influence of various heat treatments, grain size, testing velocity, and aging at room temperature. Graphs and photographs. (Q24, G4, Cu, Fe, ST)

940-Q. Possibilities for Further Improvement of High-Strength, Weldable Structural Steels. F. Nehl. 4th International Mechanical Engineering Congress. June 1952, 16 pages.

Mechanical properties of structural steels in relation to structure and alloying elements; weldability; and post-weld mechanical properties. Development and mechanical properties of new Al steels suitable for welded construction. Development and properties of a Cu-Ni-Mo steel with excellent weldability, in contrast to other heat treatable steels. Graphs. (Q general, K9, CN, AY)

941-Q. Potential Applications of Boron-Treated Steels. A. Dammer and E. Theis. 4th International Mechanical Engineering Congress, June, 1952, 15 pages.

A series of basic tests made in Germany on boron steels cover deoxidizing and denitriding conditions; influence of increasing amounts of Mn, Cr, Mo, and Ni on hardening characteristics of B-free and B-alloyed grades of carburizing and heat treatable steels; mechanical properties and hardness. Applicability of boron steels. Tables and graphs. (Q general, T general, D general, AY)

942-Q. Resistance to Wear of Copper and Copper Alloys. Olof Hindbeck. 4th International Mechanical Engineering Congress, June 1952, 5 pages.

Resistance to mechanical wear for ten different Cu alloys was studied by having a rotating steel wheel rub with constant load and varying testing times against the flat ground surface of test bars. Table and graph. 10 ref. (Q9, Cu)

943-Q. Some Factors Determining the Choice of Materials and Methods for Mass Production of Non-Ferrous Details. B. Starck. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Dependence of manufacturing costs on workability (covers castings, extruded sections, forgings, and machining). Manufacture of a high-speed brass valve housing as an example of suitable application of good workability of nonferrous material. Dependence of material costs on properties (with diagrams of rupture details of Al castings). Dependence of material costs on workability. Materials discussed include alloys of Mg, Al, Cu, and Zn. (Q23, Al, Mg, Cu, Zn)

944-Q. The Time Stability of High-Temperature Steels. H. Holdt. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Graphs and tables show results of long-time creep tests with Cr-Ni-Mo steel; ultimate stresses and elongations after rupture during long-time creep tests (tension) for Cr-Ni-Mo, Cr-Mo, and Cr-Mo-V steels; and constant creep-elongations due to tension or bending stresses of a Cr-Mo cast steel and a Cr-Mo-V-W steel. Photomicrographs of structure. Evaluation of short time tests for providing information on long-time elevated temperature behavior. (Q3, Q4, M27, AY, SG-h)

945-Q. (French.) **The Development of Gray Irons. High Strength Irons.** M. Ballay. 4th International Mechanical Engineering Congress, June 1952, 17 pages.

The available gray irons and their strength and shock resistance. Alloyed and nonalloyed gray iron, gray iron with spheroidal graphite, and the resistance of these various types to wear and friction. Tables. (Q23, Q9, CI)

946-Q. (French.) **Use of the Principle of Raising the Elastic Limit of Steels by Strain Hardening and Artificial Aging for Construction of Penstocks, and Resultant Savings.** M. Georges Ferrand. 4th International Mechanical Engineering Congress, June 1952, 30 pages.

Includes diagrams, photographs, and tabulated mechanical properties. Details of calculations are given in appendixes. (Q21, T4, ST)

947-Q. (French.) **The Physics of the Deformation of Metals.** E. N. da C. Andrade. *Revue de Métallurgie*, v. 49, July 1952, p. 469-484.

A series of experiments concerning the mechanical properties of pure and semipure metals. Diagrams, graphs, and micrographs. (Q24)

948-Q. (French.) **The Fatigue of Metals.** M. Ros. *Revue de Métallurgie*, v. 49, July 1952, p. 497-510.

Application of the Coulomb-Mohr theory to interpretation of the problem of fracture of metals in general. Macrographs. (Q7)

949-Q. (French.) **Creep Tests for the Acceptance of Nimonic Alloys for Gas Turbines.** C. W. Weaver. *Revue de Métallurgie*, v. 49, July 1952, p. 511-522; disc., p. 522-523.

Describes a new laboratory, arrangement of the apparatus, operation of the individual machines, electrical control devices, construction of the furnace, and regulation of the temperature. Diagrams and photographs. (Q3, Ni)

950-Q. (German.) **Converter Steel Refined With Pure Oxygen and Its Properties.** Wolfgang Kühnelt. *Stahl und Eisen,* v. 72, Aug. 14, 1952, p. 1004-1010.

Segregation conditions, nonmetallic inclusions, and density of ingots. Hot and cold forming properties, ductility of wire, deep drawability of sheet and strip, tensile strength, notched-bar impact strength, workability, weldability, hardenability, creep strength, etc. Graphs. (Q general, M27, M28, K9, J26, CN)

951-Q. (German.) **Properties of Steels Refined in the Converter by Blowing Pure Oxygen From the Top.** Hubert Hauttmann. *Stahl und Eisen,* v. 72, Aug. 14, 1952, p. 1011-1018; disc., p. 1019-1024.

Comprehensive tests on 12 test melts of variable composition. Tensile and impact strength, weldability, cupping, corrosion resistance, electrical properties, and magnetic properties. Numerous graphs and tables. (Q27, Q6, K9, R general, P15, P16, CN)

952-Q. (Portuguese.) **Influence of Graphite and the Matrix on Some Mechanical Properties of Common Cast Irons.** Werner Grundig. *Boletim da Associacao Brasileira de Metais,* v. 8, Jan. 1952, p. 77-107.

Tension, bending, and hardness properties were investigated in 31 common cast-iron test bars with a predominantly pearlitic or hypereutectoid matrix. Among other factors, the effect of deformation of the graphite and of degree of saturation of the metallic matrix were studied. Photographs and tables. 14 ref. (Q27, Q5, Q29, CI)

953-Q. (Portuguese.) **Examples of Industrial Application Based on the Properties and Characteristics of Nickel and Its Alloys.** Horace A. Hunnicutt. *Boletim da Associacao Brasileira de Metais,* v. 8, Jan. 1952, p. 48-76.

Pure or semipure Ni, alloys with high and low Ni content, and their application with respect to resistance to corrosion, resistance to heat, magnetic and electric effects, and improvement of their physical and mechanical properties. 37 ref. (Q general, P15, P16, R general, Ni)

954-Q. (Russian.) **Use of Magnetic Method for Checking the Hardness of Hardened Parts.** N. A. Gutsula. *Promyshlennaia Energetika,* v. 9, Jan. 1952, p. 18.

A magnetic hardness tester. Circuit diagrams. (Q29)

955-Q. (Book.) **Abrasion Hardness.** T. A. Jaggar. 43 pages. 1950. Hawaiian Volcano Research Assn., Honolulu, T. H. (5th Special Report, Hawaiian Volcano Observatory and U. S. Geological Survey.)

After reviewing the work of sclerometry, it is shown that yielding and relative softness are the mechanical basis of what should be called malacometry. Experiments were made with diamond drills, ring cuts, end millers, and grinding wheels on minerals, woods, and steels. Diagrams, graphs, and illustrations. (Q29, ST)

956-Q. (Book.) **Resumé of High Temperature Investigations Conducted During 1948-50.** 113 pages. 1950, Timken Roller Bearing Co., Canton 6, Ohio. Gratis.

Trends in high-temperature and high-pressure steels; some metallurgical characteristics of 12-14% Cr steel; properties of a Mo-V steel; effect of hardness on rupture strength of steels at 1050° F.; metallurgical examination of various tubes after service; properties of Timken 18-12 + Ti steel; high-temperature properties of 2¼% Cr + 1% Mo and 18-8 tubes after service; elastic constants at elevated temperatures; creep and rupture tests of 10,000 hr. duration; rupture characteristics of carbon steel and Sicromo 2½; ductility of austenitic steels after cooling from 1500° F; formation of sigma phase in austenitic steels; Izod vs. Charpy impact-test results. (Q general, SS, ST, SG-b)

957-Q. (Book.) **Strain Gauges: Theory and Application.** J. J. Kock, R. G. Boiten, A. L. Biermasz, G. P. Roszbach, and G. W. Van Santen. 93 pages. 1952. (Philips Technical Library.) Cleaver-Hume Press, 42a S. Audley St., London, W. 1, England. 15s. Also Elsevier Press Inc., 402 Lovett Blvd., Houston 6, Texas. $2.75.

The most successful sections provide a detailed description of the method of cementing a strain gage to a metal surface by means of nitrocellulose cement, wiring of the gage, and an account of the inaccuracies, chiefly electrical in origin, which may occur in this method of measuring strain. Clear instructions on bonding and wiring. The remainder of the book is mainly a repetition of information already given in textbooks on the subject. (From review in *Engineering.*) (Q25)

R

CORROSION

429-R. Application of Fuels and Lubricants in Utility Fleet Operations. William A. Howe. *American Gas Association, Proceedings,* v. 33, 1951, p. 318-344.

Photographs, graphs, and tables show effects of fuels and various oils on engines (including wear and corrosion) and their performance. (R7, Q9)

430-R. The Elementary Mechanism of Cathodic Protection. Keith K. Reid, G. C. English, and Ralph L. Horst. *American Gas Association, Proceedings,* v. 33, 1951, p. 351-360.

Fundamental mechanism illustrated with circuit and other diagrams. Tables. (R10)

431-R. The Performance of Impressed Current Ground Beds. A. W. Peabody. *American Gas Association, Proceedings,* v. 33, 1951, p. 448-455.

Summary of that part of cathodic protection engineering dealing with ground beds used to introduce protection current into the ground from an external source. Development, present practices, effects of soil conditions and anode configuration, selecting sites, and designing installations. Diagrams and chart. (R10)

432-R. Practical Experiences in Corrosion of Hot Water Tanks. R. L. Featherly. *American Gas Association, Proceedings,* v. 33, 1951, p. 456-460.

General information on this corrosion problem, including galvanized tanks; and experiences involving use of Mg rod for cathodic protection. (R4, R10, ST, Mg, Zn)

433-R. Why We Incorporate a Corrosion Control Program in the Early Stages of Construction in a Modern Gas Transmission System. E. Clyde McGraw. *American Gas Association, Proceedings,* v. 33, 1951, p. 464-466.

Experiences of Transcontinental Gas Pipe Line Corp., Houston. (R9, ST)

434-R. Special Tests for Stainless Steels. J. Lomas. *British Steelmaker,* v. 18, Aug. 1952, p. 414-417.

Surveys various mechanical and corrosion-test procedures. (R11, SS)

435-R. Electrical Method Being Tested to Protect Hulls From Corrosion. Herman S. Preiser. *Bureau of Ships Journal,* v. 1, July 1952, p. 12-14.

Use of cathodic protection. (R10, ST)

436-R. Corrosion Testing; a Tool of Conservation. E. G. Holmberg. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 377-380.

Value of corrosion testing. Methods and apparatus used, and data obtained for several stainless steels, nonferrous alloys, and special high-temperature alloys in solutions of various common organic chemicals at temperatures of 223 and 270° F. Photographs and diagrams. (R11, SS, EG-a, SG-g, h)

437-R. Technical Facts for Food Processors on Nickel and High-Nickel Alloys. Part I. Corrosion Fundamentals and Specific Data on Tomato Units. *Food Engineering,* v. 24, No. 8, Aug. 1952, p. 79-81, 218, 220-221.

Compositions, mechanical properties, heat transfer rates, and corrosion resistance to tomato products. Data tabulated. (To be concluded.) (R5, P11, Q general, T29, Ni)

438-R. Weathering Tests Reveal Aluminum Nail Data and Techniques. *Light Metal Age,* v. 10, Aug. 1952, p. 18, 25.

See abstract of "Atmospheric Exposure Tests of Nailed Sheet-Metal Building Materials", Theodore H. Orem. *National Bureau of Standards,* Building Materials and Structures Report 128; item 318-R, 1952. (R3, K13, Al, ST, Zn)

439-R. The Effect of Excreta on Aluminium and its Alloys. R. Butler and E. W. Skerrey. *Light Metals,* v. 15, Aug. 1952, p. 261-266. (Reprinted with revisions from *Water and Sanitary Engineer,* Apr. 1952.)

Effects of human and animal excreta on Al and its alloys is being investigated in a sewage disposal plant, a factory latrine, and a cattle barn. Results obtained after exposures up to 3½ years indicate that Al and its alloys are suitable for use in each of these environments and that NS4 (BA.21) is the most generally suitable alloy. Photographs and tables. (R7, T29, Al)

440-R. Control Galvanic Corrosion —Stop Costly Failures. E. C. Reichard. *Materials & Methods,* v. 36, Aug. 1952, p. 83-86.

Advantages and disadvantages of several methods for either eliminating galvanic action or controlling its destructive effects, including protective coatings, inhibitors, and sacrificial anodes. (R1)

441-R. Gas-Condensate Well Corrosion. What It Costs and How to Combat It. T. S. Zajac. *Oil and Gas Journal,* v. 51, Aug. 11, 1952, p. 108, 110, 112.

Summary of what is being learned about this costly problem—what causes it, how to detect and evaluate it, and techniques and measures for controlling it. (R7)

442-R. These Tools Ferret Out Corrosion. Kenneth W. Robbins and Warner M. Kelly. *Oil and Gas Journal,* v. 51, Aug. 25, 1952, p. 114, 117, 120, 143-145.

Various means for determining location and severity of corrosion in oil and gas wells, also of different types of corrosion. (R11, ST)

443-R. Magnesium Anode Installations in the Gas Distribution System. H. M. McCamish. *Pipe Line News,* v. 24, July 1952, p. 36-38; Aug. 1952, p. 37-40.

Described and diagrammed. (R10, T4, ST, Mg)

444-R. Corrosion. 7. Corrosion Testing. W. C. Britton. *Research,* v. 5, Aug. 1952, p. 377-384.

Service, field, and laboratory tests. 46 ref. (R11)

445-R. Acids and Heat-Resisting Properties of Nodular Cast Iron. Ichiro Iitaka and Kazuhiko Sekiguchi. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 17-19.

Results for acidic and aqueous corrosion and high-temperature oxidation of nodular cast iron, ordinary cast iron, and mild steel are charted and discussed. (R5, R2 CI, CN)

446-R. Influence of Lead to Zamak Alloys for Die Casting. Nobutaro Kayama and Masakazu Ichida. *Reports of the Casting Research Laboratory,* No. 3, 1952, p. 48-51.

Effects on aqueous corrosion resistance, thermal expansion coefficent, and impact strength of Zn-Al-Cu alloys containing 0.005-0.04% Pb. Tables and graphs. (R5, Q6, P11. Zn)

447-R. How To Increase Corrosion Resistance After Welding. *Steel Horizons,* v. 14, Summer 1952, p. 20-23.

Experimental equipment. Macrographs and micrographs show effects of corrosive attack on welds in types 430 and 442 straight Cr steels. Effects of heat treatment and of Ti additions. (R general, K9, SS)

448-R. The Ferroxyl Reagent Applied to a Study of Knitting Needle Corrosion. F. Bryant. *Textile Research Journal,* v. 22, Aug. 1952, p. 553-554.

Tests were carried out on the corrosion problem and the above method proved satisfactory. Needles are of alloy steel. (R11, AY)

449-R. (French.) **Research on Anodic Oxidation of Ferrochromium. V. Oxidation in Acid and Neutral Solution.** Jean Besson and Ulrich Bohnstedt. *Bulletin de la Société Chimique de France,* May-June 1952, p. 624-628.

Anodic oxidation in H_2SO_4 solution. Variations with concentration of the acid, voltage, duration of the experiment, temperature, and concentration of Cr^{+3}. Data are tabulated and charted. (R2, L19, Fe-n, Cr)

450-R. (French.) **Solubility of Metals in Water.** J. C. Pariaud and P. Archinard. *Bulletin de la Société Chimique de France,* May-June, 1952, p. 454-456.

Investigated at room temperature, for Zn, Pb, Cu, Ag, and Hg in chemically pure water. Experimental methods, and various processes for the determination of dissolved metals. Tables. 11 ref. (R4, S11, Zn, Pb, Cu, Ag, Hg)

451-R. (German.) **The Electrochemical Influence of Oxide Films and Oxygen Upon the Rate of Corrosion of Metal Surfaces, Especially of Iron.** F. Tödt. *Metalloberfläche,* sec. A, v. 6, Aug. 1952, p. A125-A126.

Method for calculating the above rate. Results of experiments. 11 ref. (R1, Fe)

452-R. (German.) **Influence of Furnace Atmosphere on Surface Finish of Round Ingots and Tubes.** Werner Scheurer. *Stahl und Eisen,* v. 72, July 31, 1952, p. 935-941.

Laws governing the scaling process. Dependence on temperature, thickness of scale layer, time, rate of gas flow, type of gas, and its composition. Operation with oxidizing and reducing flames. Effect of an atmosphere rich in sulfur. Effect of protective gases. Experimental results tabulated, charted, and illustrated. 39 ref. (R2, J2, ST)

453-R. (German.) **Materials Testing to Establish the Cause of the Explosion of a Fireless Locomotive by Fracture of the Boiler Flange.** Hans Biegler. *Technik,* v. 7, Mar. 1952, p. 131-134.

Intercrystalline corrosion is shown to have been the cause of the explosion. Photographs, photomicrographs, tables and references. (R2, S21, CN)

454-R. (Italian.) **Analysis of Metallic Sound as a Test Method. I. Study of Intercrystalline Corrosion in 18-8 Stainless Steels. Characteristic Symmetries in the Elastic Moduli.** Oscar Masi and Antonio Ferri. *Metallurgia Italiana,* v. 44, June 1952, p. 207-214.

Details of oscillographic procedure in which the sound emitted when test pieces are struck is collected and analyzed. This method appears to have great sensitivity in comparison with others. Typical results are tabulated, charted, and illustrated. Apparatus is illustrated. (R11, SS)

455-R. Fighting Marine Destruction. Ray E. Heiks. *Battelle Technical Review,* v. 1, Aug. 1952, p. 89-90.

The seriousness of the problem of marine destruction and latest method employed to combat it. Use of paint coatings for corrosion prevention; also use of corrosion resistant alloys. (R1, L26)

456-R. Hastelloy Alloy D. Edward D. Weisert. *Chemical Engineering,* v. 59, Aug. 1952, p. 258, 260, 262, 264, 266-267.

Resistance of this Ni-Si-Cu alloy to a number of corrosives, with data on mechanical properties and applications in the chemical process industries. Charts show corrosive effects of a wide variety of common chemicals. (R general, Q general, T29, Ni)

457-R. The Protective Properties of the Natural Oxide Film on Aluminium. J. M. Bryan. *Chemistry & Industry,* Aug. 23, 1952, p. 820-822.

Behavior under immersed conditions, reaction with water, factors influencing corrosion, galvanic action, and corrosion by food products. 38 ref. (R1, Al)

458-R. Technical Practices Committee. I. Corrosion in Oil and Gas Well Equipment. H. L. Bilhartz. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 293-295.

Origin, accomplishments, and membership of above organization. (R general)

459-R. Corrosion Control in Gas-Lift Wells. D. A. Shock and J. D. Sudbury. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 296-299.

A study based on South Texas oil fields where severe corrosion was found although producing pressures were not abnormally high. (R7, ST)

460-R. Potential Measurements in Cathodic Protection Designs. Robert P. Howell. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 300-304.

Four criteria for determining effective cathodic protection: current density, potential change, current-potential curves, and $CuSO_4$ potential. Methods, instruments, techniques, and examples of potential measurements. Multiple-rectifier systems, pipelines in salt water, steel structures in salt water, and oil and gas well casings. 10 ref. (R10, ST)

461-R. The Role of Oxygen in Corrosion and Cathodic Protection. Roy V. Comeaux. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 305-309; disc., p. 310.

Practical application of cathodic protection to the underground lines and tank bottoms in Baytown, Texas, refinery of Humble Oil and Refining Co. (R10, ST)

462-R. Cathodic Protection at Steam-Electric Generating Stations. J. H. Collins and E. H. Thalmann. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 314-320.

Corrosion of underground structures, applications of cathodic protection, and testing procedures. (R10, ST)

463-R. Corrosion Resistance and Protective Systems or Coatings for Magnesium Alloys. Hugo A. Barbian. *Engineer Research and Development Laboratories* (Ft. Belvoir, Va.), "The Magnesium Symposium," Feb. 9, 1951, p. 37-57.

Includes graphs, tables, and illustrations. (R general, L general, Mg)

464-R. Reduction of Wear and Corrosion by Suitable Design and Choice of Materials. O. Niezoldi. *Engineers' Digest,* v. 13, Aug. 1952, p. 245-246. (Translated and condensed from *Konstruktion,* v. 4, p. 145-148.)

Diagrams illustrate miscellaneous pieces of machinery. (R general, Q9)

465-R. Role of Crystal Orientation in the Oxidation of Iron. Earl A. Gulbransen and Roswell Ruka. *Journal of the Electrochemical Society,* v. 99, Sept. 1952, p. 360-368.

Results of experiments using the electron-diffraction high-temperature camera for the oxidation of single crystals of Fe as related to the process of oxidation and corrosion. Photographs and tables. 32 ref. (R2, M26, Fe)

466-R. Some Factors Affecting the Resistance of Austenitic Chromium-Nickel Steels to Attack by Hot Concentrated Nitric Acid. H. T. Shirley and J. E. Truman. *Journal of the Iron and Steel Institute,* v. 171, Aug. 1952, p. 354-358.

Behavior of high-alloy Cr-Ni steels in conc. HNO_3. Certain factors which influence the resistance of normally heat treated unwelded 18-13-1 Cr-Ni-Nb type steel to boiling 70% HNO_3. Graphs, tables, photomicrographs. (R6, SS)

467-R. A Generalized View of the Scaling Behavior of Metals. James T. Waber. *Metal Progress,* v. 62, Sept. 1952, p. 76-80.

Mathematical growth laws and the Pilling-Bedworth ratio. Graphs and tables give results of scaling experiments with various metals. (R2)

468-R. Cavitation Research. *Metal Progress,* v. 62, Sept. 1952, p. 156, 158-159. (Condensed from "Accelerated Cavitation Research", W. J. Rheingans, *Transactions of the American Society of Mechanical Engineers).*

Previously abstracted from original. See item 277-R, 1950. (R2)

469-R. Water Heater Corrosion Studies. Roy E. Dodson, Jr. *Water and Sewage Works,* v. 99, Sept. 1952, p. 345-349.

Methods of carrying out the studies, and tabulated results. Tables and photographs. (R4, CI, Zn)

470-R. Making the Ocean a Test Tube. H. C. Phelps. *Welding Engineer,* v. 37, Sept. 1952, p. 32-34, 48.

Effects of sea spray, sea air, and immersion are being studied for various metals and alloys at marine corrosion testing stations along the North Carolina coast. Facilities and procedures. (R4)

471-R. Intergranular Corrosion in Austenitic Stainless and Acid Resisting Steels and Methods for Determination of Sensitivity to This Corrosion. Bo Hermelin. 4th International Mechanical Engineering Congress, June 1952, 16 pages.

The intergranular corrosion problem and methods for decreasing susceptibility to this defect. Compares existing test methods for susceptibility to this form of corrosion and otherwise lays the groundwork for a new method suitable for steels intended for welded application. Photomicrographs and diagrams. 25 ref. (R2, SS, SG-g)

472-R. (German.) **Testing of Corrosion-Protective Wrappings by Electric**

Measurements. Willi Willing. *Gas- und Wasserfach*, v. 93, Aug. 1, 1952, p. 434-437.

Proposes measurement of electric resistance of wrappings in order to indicate their corrosion-protective properties. Three types of wrappings were investigated, those adhering to the metal without application of heat, those requiring heating during application, and a combination of the two types. (R11, L26)

473-R. (Russian.) **A General Theory of Electrochemical Corrosion Prevention.** G. A. Akimov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 745-748.

Discussion clarified by diagrams and graphs. (R1)

474-R. (Russian.) **The Inhibition of the Solution of Copper in Nitric Acid.** S. A. Balezin and G. S. Parfenov. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 133-136.

Sodium sulfide, sodium sulfite, sodium thiosulfate, urea, thiourea, potassium permanganate, potassium chlorate, and hydrogen peroxide were tested as inhibitors. Effects of composition and temperature were determined. Data are tabulated and charted. (R10, Cu)

475-R. Design Considerations for Heat and Corrosion-Resistant Castings. E. A. Schoefer. *Machine Design*, v. 24, Sept. 1952, p. 148-154.

Differentiation between low, high, and superalloys. Includes comprehensive table of room-temperature mechanical properties. Main groups are low-alloy and stainless steels, and special alloys (Co-and Ni-base). (R general, Q general, AY, SS, SG-g, h)

476-R. Sweet Oil Well Corrosion. H. L. Bilhartz. *Petroleum Engineer*, v. 24, Sept. 1952, p. B78, B82, B87-B88.

See abstract from *World Oil;* item 198-R, 1952. (R7, ST, Ni, Zn)

477-R. Soil Resistivity Instruments and Measurements. O. W. Wade. *Pipe Line News*, Sept. 1952, p. 38-39.

Discussion to aid in pipe-line corrosion control programs and in selection of methods and instruments for measuring soil resistivity. (R8)

478-R. Corrosion. 8. Vapour Phase Inhibitors. H. L. Bennister. *Research*, v. 5, Sept. 1952, p. 424-432.

Vapor-phase corrosion inhibitors need not be in direct contact with the surface to be protected, but can exert their influence over a distance in space. They may be used in powder form, solution, or coated on paper; for the preservation of the interior of engines and similar machines, and of packaged equipment. 17 ref. (R10)

479-R. Some Corrosion Problems of Copper Alloys of Special Interest to Workshops. E. Börje Bergsman and Göte Renman. 4th International Mechanical Engineering Congress, June 1952, 6 pages.

Examples of corrosion attacks that have occurred in the workshop, classified under the headings of tarnishing and oxidation, galvanic corrosion, stress-corrosion, and dezincification. (R1, R2, Cu)

480-R. Stress-Corrosion in Special Copper-Alloys. O. Lissner. 4th International Mechanical Engineering Congress, June 1952, 18 pages.

Fourteen different Cu alloys were subjected to a test method for rapidly determining resistance to stress-corrosion by using test rods immersed in normal ammonia solution at 80° C. Effects of shape of test piece and stresses. Photomicrographs showing structure; stress-corrosion cracks, tables, and graphs. 18 ref. (R1, Cu)

481-R. (German.) **Rust Prevention.** Otto Gerhardt. *Werkstoffe und Korrosion*, v. 3, Aug. 1952, p. 294-299.

Use of Al bronze as an anticorrosive paint in southern climates. Critical discussion by Willi Machu and by Fritz Todt is appended. 32 ref. (R10, L26, Fe)

482-R. (Book) **Corrosion Testing Procedures.** F. A. Champion. 369 pages. John Wiley & Sons, 440 4th Ave., New York 16, N. Y. $6.25.

Five distinct steps in corrosion testing procedure: Choice and preparation of metal and corrosive; exposure of the metal to laboratory or field environment; cleaning of the specimens preparatory to examining; examination of the specimens and corrosive; and expression and interpretation of results, with particular reference to form of the corrosion-time curve. Detailed ref. (R11)

483-R. (Book.) **An Engineer's Approach to Corrosion.** C. F. Trigg. 133 pages. 1952. Sir Isaac Pitman & Sons, Ltd., 39 Parker St., Kingsway, London W.C.2, England. 15s.

Chapters are devoted to classification and importance of corrosion; mechanism; corrosion under special conditions; effects; prevention; permanent and temporary protective treatments. A variety of metallic and nonmetallic materials are covered. (R general)

S
INSPECTION AND CONTROL

424-S. Pressed Metal—in Process Control Techniques. Glenn U. Hinds. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 105-120.

Method used at the Buick pressed metal plant. Provides a working S.Q.C. tool, based on results of case studies and containing sufficient detailed description to enable the establishment of similar procedures in other plants. Photographs and charts. (S12, G1)

425-S. Applicability and Inapplicability of Mil-Std-105A. John W. W. Sullivan. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 275-279.

A discussion to help government and industry use the "Military Standard Sampling Procedures and Tables for Inspection by Attributes". Refers especially to cases where random sampling cannot be practiced. (S12)

426-S. Quality Control in Precision Manufacture. O. W. Hitchcock. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 297-303.

A technique used at Scintilla Magneto Div., Bendix Aviation Corp., for controlling the thickness of silver plating on small parts of Te-Cu rod. Chart. (S12, L17, Ag. Te, Cu)

427-S. Narrow Limit Gaging. Ellis R. Ott. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 321-330.

Experiences with the use of NL gages. Indicates theory to provide a practical basis for applications of the methods. Table and diagrams. (S12, S14)

428-S. Engineering the Inspection of Industrial Processes. Nelson G. Meagley. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 397-407.

Examines present state of quality control in terms of an engineering approach to the inspection function; and points out some observations regarding the present state of quality-control development. Charts. (S12)

429-S. Quality Control Techniques in the Aircraft Industry. H. Earle Moore. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 409-417.

Procedures used at McDonnell Aircraft Corp. Covers the 3 m's: material, machines, and man. (S12)

430-S. Quality Control of Steel Manufacture. Richard H. Ede. American Society for Quality Control. "Quality Control Conference Papers, 1952", p. 421-426.

New developments at U. S. Steel Co. Deals especially in application of quality control to heat times and to operation of soaking pits. Charts and table. (S12, D9, ST)

431-S. Polarographic Determination of Iron in Nonferrous Alloys. Louis Meites. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1374-1376.

General method which consists of reduction of Cu to the metal with amalgamated Zn. Tables. 14 ref. (S11, Fe, EG-a)

432-S. Modern Air Gauging. J. C. Pierce. *Compressed Air Magazine*, v. 57, Aug. 1952, p. 225-226.

Various types of instruments. (S14)

433-S. Natural and Artificial Sources for Gamma Radiography. B. N. Clack. *Engineer*, v. 194, Aug. 8, 1952, p. 195-198.

Requirements as applied to four groups of uses. Preparation of a radiographic source using radon and some of the problems encountered. Diagrams, graphs, and illustrations. (S19)

434-S. Surface Profile Measurement Using the Microscope. S. Tolansky. *Laboratory Practice*, v. 1, p. 193-196.

The technique described can be used with magnifications ranging from 100 to 2000 and resolutions to ¼μ are obtainable. The method is simple to apply, inexpensive, and nondestructive. It has the advantage of giving profiles over an extended area. Typical results. (S15)

435-S. Approximately Equivalent American and British Steel Specifications (Based on Composition). *Materials & Methods* v. 36, Aug. 1952, p. 135.

(S22, ST)

436-S. From a Metallurgist's Notebook: Cracked Brass Bobbins. *Metal Industry*, v. 81, Aug. 8, 1952, p. 107-108.

A report on the cause of premature failure by cracking of brass bobbins and bobbin protectors. (S22, Q26, Cu)

437-S. How to Check Quality of Surface Finish. *Standardization*, v. 23, Aug. 1952, p. 228-242.

Introduction followed by three articles: "The 'Why' of the Surface Finish Standards", James A. Broadston; "The Use of Standard Roughness Comparison Specimens", Donald E. Williamson; and "The 'Gold Standard' Precision Specimens of Surface Roughness", C. R. Lewis. Diagrams and illustrations. (S15)

438-S. Ultrasonic Techniques: Some Effects and Applications. D. O. Sproule. *Times Science Review*, Autumn, 1952, p. 14-15.

An illustrated review. 16 ref. (S13)

439-S. On Quantitative Determination. I. Principles, II. Errors Caused by Absorbing Particles, III. Multiple Guinier Camera With Adjustable Curved Crystal Monochromator. P. M. de Wolff. "Selected Topics in X-Ray Crystallography From the Delft X-Ray Institutes" (Interscience Publishers, New York), 1951. p. 211-260.

Quantitative analysis using X-ray diffraction techniques. Methods; the systematic error due to absorption in the powder particles; a photographic technique. 28 ref. (S11)

440-S. (German.) **Influence of Structure on the Appearance of the Sparks**

Appearing During Polishing of Unalloyed and Alloyed Steels. Johanna Hunger and Otto Werner. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 277-286.

Dependence of appearance and size of the sparks upon carbon content. The possibility of characterizing the structure of chemically identical unalloyed steels and cast iron from the appearance of the sparks. Tabulated data, micrographs and diagrams. 27 ref. (S10, CN, AY)

441-S. (German.) Structure of Metal Surfaces. (According to New Investigations by Electron Beams.) H. Raether. *Metalloberfläche*, sec. A., v. 6, Aug. 1952, p. A113-A119.

The mechanism of surface analysis by means of electron beams. Results of the investigation on mechanically and electrolytically polished metal surfaces. Electron micrographs and diffraction patterns. 12 ref. (S15, M22)

442-S. (German.) Measurement of Thicknesses by Means of Radiation Methods. *Stahl und Eisen*, v. 72, July 31, 1952, p. 941-947.

Report consists of four articles: "Approximate Measurement of Thicknesses of Less Than 1 Mm. by Means of Beta-Rays", Adolf Trost; "Measurement of Thicknesses of up to Approximately 10 Mm. by Means of X-Rays and a Counting Tube", Hans Werner Fritze; "Measurement of Thicknesses of Approximately 10-100 Mm. by Means of Gamma-Rays and a Counting Tube", Wolfgang Kolb; and "Measurement of the Thicknesses of Nonferromagnetic Layers on Nonferromagnetic Bases by Means of Beta-Rays and a Counting Tube", Rudolf Berthold. Diagrams, graphs, and illustrations. (S14)

443-S. (German.) Significance of Zn as an Alloy in Spectrographic Investigations of the Al-Mg System. Jan Van Calker and Rudolf Wienecke. *Zeitschrift für angewandte Physik*, v. 4, June 1952, p. 210-215.

Results of experiments show that effect of Zn on spectrographic analysis varies with Zn content and various analytical conditions. Graphs. 15 ref. (S11, Al, Mg, Zn)

444-S. (German.) Polarographic Determination of Indium in the Presence of Other Metals, Especially Zinc. Günther Rienäcker and Erhard Hoschek. *Zeitschrift fur anorganische und allgemeine Chemie*, v. 268, Nos. 4-6, 1952, p. 260-267.

A method of preventing the interfering effect of Cd. This method can also be used to determine In in commercial Zn. Graphs and tables. 10 ref. (S11, In, Zn)

445-S. (German.) Sampling and Sorting of Metallic Samples. Josef Blanderer. *Zeitschrift für Erzberghau und Metallhüttenwesen*. v. 5, July 1952, p. 257-262; disc., p. 262-263.

Mathematical and mechanical problems involved. Practical suggestions for various types of alloys. (S12)

446-S. (Italian.) Concerning the Gravimetric-Volumetric Determination of Traces of Calcium in Nearly Eutectic Al-Si Alloys. G. Luft. *Alluminio*, v. 21, June 1952, p. 237-251.

Various methods, and details of satisfactory procedure. Typical data are tabulated and macrographs and micrographs show superficial appearance and microstructure of Al-Si alloys containing Ca_2Si inclusions. 42 ref. (S11, M27, Al)

447-S. (Italian.) Notes on the Quantitative Spectrographic Determination of Manganese and Silicon in Special Steels. Mario Ongaro. *Metallurgia Italiana*, v. 44, June 1952, p. 221-225.

Results of experiments on effect of principal alloying elements on spark intensity, variation in excitation of the Mn and Si lines along the discharge section obtained with four different sources, and effect of metallurgical history of the specimen. Recommended sources for determination of Mn and Si in high speed and stainless steels. (S11, TS, SS)

448-S. Sonic Tester Checks Bonding of Honeycomb Panels. H. O. Williams. *American Machinist*, v. 96, Sept. 1, 1952, p. 116-117.

How dancing grains of sand outline unbonded areas of honeycomb panels in new sonic testing device. (S13)

449-S. Determination of Oxygen in Metals and Metal Oxides by the Isotopic Method. A. D. Kirshenbaum and A. V. Grosse. *American Society for Metals*, Preprint 39, 1952, 11 pages.

Quantitative methods for determining O_2 content of metals used at present are long, tedious, and at times not too accurate. The method described uses O^{18} and does not require quantitative separation or recovery of the O_2, thus giving fast results accurately. Accurate O_2 values were obtained with this method for several Cu-O_2 and Fe-O alloys and for Cu and iron oxides. 27 ref. (S11, Cu. Fe)

450-S. The Determination of Some Residual Elements Which Produce Harmful Effects in Magnesium-Treated Nodular Cast Iron. W. Westwood and R. Presser. *British Cast Iron Research Association Journal of Research and Development*, v. 4, Aug. 1952. p. 369-386.

Individual chemical methods of determining presence of Al, Sb, As, Bi, Pb, Sn, and Ti in pig iron. (S11, CI)

451-S. Determination of Iron in Ores, Slags, and Refractories. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 392-403.

H_2S reduction procedure for Fe determination is recommended. Confirmation is provided from extended trials on synthetic solutions and oxide-type materials. Tables. (S11, Fe)

452-S. Steel Mill Instrumentation Improves Production and Quality. L. W. Heinzinger. *Journal of Metals*, v. 4, Sept. 1952, p. 919-921.

Instruments used include bath thermocouple, optical pyrometer, and magnetic carbon analyser. (S16, S11, ST)

453-S. Mass Spectrometer; New Technique for Analysis of Metals. *Metal Industry*, v. 81, Aug. 22, 1952, p. 149-150.

New procedure developed by Gorman, Jones and Hipple of National Bureau of Standards. (S11)

454-S. The Low Down on Air Gaging. C. W. Kennedy. *Modern Machine Shop*. v. 25, Sept. 1952, p. 230-232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256.

Operating principle, use, and care of air gaging equipment. Diagrams and photographs. (S14)

455-S. Radioactive Isotope Dilution Method for Determining Sulfate Concentration in Chromium Plating Baths. Stanley L. Eisler. *Plating*, v. 39, Sept. 1952, p. 1019-1023, 1031.

See abstract "Determination of Sulphate in Chromium Baths Using Radiobarium." *Metal Finishing*, item 83-S, 1952. (S11, L17)

456-S. (Japanese.) Studies on the Surface Roughness of Metals Finished by Cutting. Norio Takenaka. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, No. 6, Mar. 1951, p. 170-206.

Investigation on effect on surface roughness of shape of tools and cutting conditions, mechanism of roughness due to built-up edges, and characteristics of surface roughness of several metals, in order to get a practical basis for selecting proper shape of tools and cutting conditions to finish metals to desired roughness. Graphs, diagrams, and profilograms. 22 ref. (S14, G17)

457-S. Safety of Welded Ships. *Times Review of Industry*, v. 6, June 1952, p. 22-24.

Different types of fractures taking place in iron and steel welding and the underlying conditions promoting these structural failures. (S21, K general, CN)

458-S. Portable X-Ray Speeds Wind Tunnel Check. *Western Metals*, v. 10, Aug. 1952, p. 42-45.

Development of new X-ray unit for testing welds in the steel plate of which the Cal Tech wind tunnel is fabricated. (S13, ST)

459-S. (French.) Comparison of Qualities of the Unalloyed Steels Used for Making Screws and Other Joining Members in Different Countries. G. Trichon. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Explains how screws, nuts, and rivets are made; necessary qualities of the material. Different designations of bolt-making steels. Tables and summary of the symbols concerning special properties, heat treatment, method of manufacture, etc. Universal symbolization of metals. (S22, G10, CN)

460-S. (French.) The Standardization of Iron and Steel Industry Products and the Problem of Supplies. H. Meriel-Bussy. 4th International Mechanical Engineering Congress, June 1952, 19 pages.

Analyzes French standards for nonalloy steel. These standards are primarily related to the mechanical characteristics of these steels. Work on simplification in France by the A.U.P.S. As an example, reference is made to semifinished forgings. World unification and simplification of steel standards and quality. Tables. (S22, ST)

461-S. (French.) Measurement of Temperatures in the Casting of Copper Alloys. Albert Blondel. *Fonderie*, July 1952, p. 3007-3022.

Various types of thermocouples, their insulation, electrical measuring instruments, and optical and radiation pyrometers. Experiments for the comparative study of the various devices. Graphs, diagrams, and photographs. 18 ref. (S16, E10, Cu)

462-S. (German.) Principles and Recommendations for Standardization of Test Methods. E. Brandenberger. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, July 1952, p. 233-238.

Summary of discussion at meeting of SVMT, May 23, 1952. (S22, Q general)

463-S. The Polarographic Determination of Titanium in Steels and Nickel-Base Alloys. R. P. Graham, A. Hitchen, and J. A. Maxwell. *Canadian Journal of Chemistry*, v. 30, Sept. 1952, p. 661-667.

Removal of interferences, apparatus and reagents, method of analysis, and applications. 25 ref. (S11, Ti, ST, Ni)

464-S. A Lock Nut and Nut Fatigue Testing Machine. *Engineer*, v. 194, Aug. 29, 1952, p. 284-285.

Machine developed for testing bolt and nut assemblies under vibration; and working at predetermined frequency, amplitude, and intensity of vibration, is designed to give in minutes and seconds ratio of efficiency to be expected from different bolts and nuts in any application. Diagrams. (S21, Q7)

465-S. Simple Tramp Iron Detector Effective at Lower Cost. C. M. Marquardt. *Engineering and Mining Jour-*

nal, v. 153, Sept. 1952, p. 96-98.

Advantages of an electronic device for mine and mill work known as the Detramp. (S10, B12, B13)

466-S. Meeting Critical Specs. Tom Hurt and F. B. McCoy. *Instrumentation*, v. 6, 3rd qtr., 1952, p. 32-33.

Temperature measurement and control in aluminum processing at Sheffield, Ala., plant of Reynolds Alloy Co. Mainly for heat treatment operations. (S16, J general, Al)

467-S. Carbon and Alloy Tool Steels; Problems of Standardization. H. Carr. *Iron & Steel*, v. 25, Sept. 1952, p. 401-405.

Concludes that some form of standardization is really necessary but must be supplemented by other more complex physical specifications. The Jominy hardenability test. Tables and graphs. 11 ref. (S22, J26, TS)

468-S. Cobalt-60 for Testing Castings. *Railway Age*, v. 133, Sept. 15, 1952, p. 76-77.

Southern Pacific finds new method of nondestructive testing effective and much cheaper than radium or X-ray equipment. (S13)

469-S. Statistical Evaluation of Rational and Stratified Methods of Sampling. Parts I and II. James V. Strela. *Tool Engineer*, v. 29, Aug. 1952, p. 37-40. Sept. 1952, p. 61-66.

Fundamentals of sampling in general and of two specific methods in particular. The methods are statistical; their logic rather than their mathematical basis is emphasized. The Thompson Sampling Machine and its operation. (To be continued.) (S12)

470-S. (Dutch.) **Several Simple Methods of Nondestructive Testing of Defects in Materials.** J. Van Nieukoop. *Metalen*, v. 7, Aug. 15, 1952, p. 247-254.

A review. Diagrams, photographs, and graphs. 12 ref. (S13)

471-S. (French.) **Measurement of the Temperature of Molten Steel.** (Continued.) P. Devilder. *Métallurgie et la Construction Mécanique*, v. 84, July 1952, p. 505-507.

Various types of indicating and recording equipment. (S16, ST)

472-S. (Pamphlet.) **Manual of Analytical Methods for the Determination of Uranium and Thorium in Their Ores.** New Brunswick Laboratory, U. S. Atomic Energy Commission, Sept. 1950, 55 pages. (For sale by Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.) 20c. (S11, U, Th)

473-S. (Book.) **Mechanical Measurements by Electrical Methods.** Ed. 2. Howard C. Roberts. 357 pages. 1951. Instruments Publishing Co., 921 Ridge Ave., Pittsburgh, Pa.

No extensive revision. Part I: Basic principles of circuits and systems and their abilities and applications. Part II: Possibilities of the art and physical forms of the equipment employed in realizing these possibilities. Five chapters deal with gaging methods. 330 ref. (S14)

474-S. (Book.) **Quality Control Conference Papers, 1952.** 452 pages. American Society for Quality Control, New York. $3.50.

Papers presented at the 6th annual convention, American Society for Quality Control, May 22-24, 1952, Syracuse, New York. Subjects relate to industries such as chemical, metallurgical, electrical, aircraft, food, automotive, textile, and pulp and paper; accounting and mathematical aspects; military standards, psychology; etc. Papers of metallurgical interest are separately abstracted. Tables, charts, photographs, and references. (S12)

475-S. (Pamphlet.) **Sampling and Analysis of Tin Ingots.** J. W. Price. *Tin Research Institute* (England), Aug. 1951, 5 pages. Gratis.

Details of recommended procedures. (S11, Sn)

476-S. (Book.) **Steelwork in Building.** William Basil Scott. E. & F. Spon, Ltd., 22 Henrietta St., London. W.C.2, England. 25s.

Described as "A Commentary on the British Standard Specification on the Use of Structural Steel in Building Printed With the Specification." Based on the revised British Standard (No. 449: 1948), on which the new section tables issued by the steel manufacturers are based. (S22, T26, CN)

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APPLICATIONS OF METALS IN EQUIPMENT

432-T. Equipment and Procedure for Service Renewals With Soft Copper Tube. I. S. Webster. *American Gas Association, Proceedings*, v. 33, 1951, p. 361-379.

Experiences in replacing old utilities pipe with copper tube. Compares cost with use of unwrapped steel pipe. Diagram and photographs. (T4, Cu, ST)

433-T. Aluminum Decals Require no Fasteners. *Automotive Industries*, v. 107, Aug. 15, 1952, p. 39.

Metal decal to carry operating instructions, trade marks, and firm names on automotive and aircraft equipment. (T10, Al)

434-T. Selection and Treatment of Die Steels. Stewart G. Fletcher. *Better Enameling*, v. 23, Aug. 1952, p. 17-19, 22-23, 26-29.

Previously abstracted from *Tool Engineer*. See item 217-T, 1952. (T5, Q general, CN)

435-T. Aluminium Motor Yacht "Tonquin". *Engineering*, v. 174, Aug. 8, 1952, p. 188-189.

A 14-ton all-aluminum vessel. (T22, Al)

436-T. Porcelain-Enamel Panels Introduced for Tunnel Hung-Ceiling Construction. T. O. Blashke. *Engineering News-Record*, v. 149, Aug. 21, 1952, p. 37-38.

Innovation in the Elizabeth River Tunnel between Portsmouth and South Norfolk, Va. (T4, CN)

437-T. Building Walls of Stainless Steel. *Iron Age*, v. 170, Aug. 21, 1952, p. 65.

Construction of walls for Equitable Life Insurance buildings in Pittsburgh. (T26, SS)

438-T. Magnesium Acceptance Growing. R. D. Raddant. *Iron Age*, v. 170, Aug. 21, 1952, p. 74, 77.

Increasing tendency toward use of Mg and alloys in automobile industry. (T21, Mg)

439-T. Industrial Blades and Knives. *Iron & Steel*, v. 25, Aug. 1952, p. 358, 377.

French facilities for manufacture, including manufacture of the steel and its heat treatment; and machining and grinding processes. (T6, D general, G17, J general, ST)

440-T. New Aluminum Brazing Sheet. *Light Metal Age*, v. 10, Aug. 1952, p. 14-15.

New brazing sheet has a core metal of 3S alloy. One side of the core metal is clad with C43S brazing alloy to assure good joints, and the other side has an Alclad coating which offers electrolytic protection to the core. It was developed particularly for use in auto-radiator fabrication. Diagrams and macrographs. (T5, K8, Al)

441-T. Magnesium in the 1952 Automobiles. *Magazine of Magnesium*, Aug. 1952, p. 1-3.

Applications in 1952 Chrysler cars for 16 die and permanent-mold cast parts. (T21, Mg)

442-T. Magnesium Plays Important Part in Chance Vought Planes. *Magazine of Magnesium*, Aug. 1952, p. 8-11. (T24, Mg)

443-T. Gasket Materials — Their Properties and Uses. Sidney G. Kelley, Jr. *Materials & Methods*, v. 36, Aug. 1952, p. 108-112.

Deals with various types including metals. (T7)

444-T. New Roof for Alexandra Palace; Aluminium Solves Some Difficult Problems. *Sheet Metal Industries*, v. 29, Aug. 1952, p. 737-738. (T26, Al)

445-T. Pittsburgh's Dressing Up With Stainless. *Steel Horizons*, v. 14, Summer 1952, p. 3-5.

See abstract of "Building Walls of Stainless Steel", *Iron Age*; item 437-T, 1952. (T26, SS)

446-T. Purity's Here To Stay. *Steel Horizons*, v. 14, Summer 1952, p. 8-9.

Uses of stainless steel in the ice-cream plant. (T29, SS)

447-T. Hardest Alloy Whips Abrasion. *Steel Horizons*, v. 14, Summer 1952, p. 18-19.

Use of carbide-tipped pulverizing hammers in equipment for grinding a very abrasive clay. Wear resistance is so high that hammer life is increased 900-1000%. (T28, Q9, C-n)

448-T. Physics and Furnaces. M. W. Thring. *Times Science Review*, Autumn 1952, p. 4, 7.

Reviews work of BISRA on development of optimum industrial furnace design by use of models. (T5)

449-T. Cast Magnesium Wing Section Produced. *Western Machinery and Steel World*, v. 43, Aug. 1952, p. 85.

It is believed that cast wings can be produced much more rapidly and economically than conventional aircraft wings; Mg, produced from sea water, is inexhaustible. (T24, E general, Mg)

450-T. New Twist on an Old Cutter. *Western Machinery and Steel World*, v. 43, Aug. 1952, p. 102-103.

Boeing speeds production by developing a helical carbide cutter which cuts metal faster and greatly reduces time required for machining. The cutter is made by using a mechanical bender-twister to work inside the turns of an electronic induction-heater coil. (T6, G17, C-n)

451-T. (English.) **Steels for Ball Bearings.** *Aciers fins et spéciaux Francais*, June 1952, p. 52-53.

Compositions, manufacture, melting, heat treatment, inspection, and testing. (T7, AY, SG-c)

452-T. (English.) **Special Steels in the Clock and Watch Making Industry.** *Aciers fins et spéciaux Francais*, June 1952, p. 64-66.

Composition, specifications, and properties. (T9, S22, AY)

453-T. (English.) **Manufacture of Bolts, Nuts and Screws of Stainless Steel.** *Aciers fins et spéciaux Francais*, June 1952, p. 79-81.

Compositions, fabrication procedures, and mechanical properties. (T7, G10, Q general, SS)

454-T. (English.) **Modern Die Blocks.** *Aciers fins et spéciaux Francais*, June 1952, p. 88-90.

Compositions and mechanical properties of steels for forging, pressing, and stamping operations. (T5, Q general, TS)

455-T. Aluminum Challenges Copper. *Architectural Forum*, v. 97, Aug. 1952, p. 140-146.

Application of Al for wiring, panel cooling, and water piping. Photographs and diagrams. (T1, T26, Al)

456-T. Facel-Métallon Bodywork: French Methods for Coachwork in Light Alloy, Steel, or Combinations of the Two Materials. A. G. Douglas Clease. *Automobile Engineer,* v. 42, Aug. 1952, p. 310-315.

System can be used for mass production or for fabrication of one body. Diagrams and photographs. (T21, ST)

457-T. Packard Marine Diesel Engines Feature Aluminum Construction and Interchangeability of Parts. Joseph Geschelin. *Automotive Industries,* v. 107, Sept. 1, 1952, p. 40-44, 80.

Basic specifications. Diagrams and photographs. (T22, Al)

458-T. Fageol Aluminum Engine Designed for Military Use. *Automotive Industries,* v. 107, Sept. 1, 1952, p. 45, 82.

Includes use of stainless steel thread inserts. (T2, Al, SS)

459-T. Magnesium: Neglected Plane Material. H. Spencer Peterson. *Aviation Week,* v. 57, Sept. 1, 1952, p. 21-23, 25-27.

Advantages for use in primary structures. Bureau of Aeronautics research program on problems involved. Mechanical properties and corrosion preventive coatings. (T24, Q general, L general, Mg)

460-T. Magnesium in Aircraft. R. Smallman-Tew. *Canadian Metals,* v. 15, June 1952, p. 22, 24; July 1952, p. 24, 26.

See abstract of "Why Magnesium in Aircraft Construction?" *Modern Metals,* item 85-T, 1952. (T24, Mg)

461-T. All-Metal Containers Replace Wooden Ones for Aircraft Engines. *Corrosion* (News Section), v. 8, Sept. 1952, p. 1. (Reprinted from *Technical Data Digest,* Sept. 1951, p. 12.) (T24, CN)

462-T. Major Improvement in Rectifiers Is Claimed for New Titanium Dioxide Unit. *Corrosion* (News Section), v. 8, Sept. 1952, p. 14, 16. (Based on report of R. G. Breckenridge and W. R. Hosler.)

New type rectifier recently developed by the National Bureau of Standards is composed of a layer of semiconducting TiO_2, a sheet of Ti metal, and a counterelectrode of some other conducting metal. (T1, Ti)

463-T. Structural Design and Design for Extrusions. D. A. Beck. *Engineer Research and Development Laboratories* (Ft. Belvoir, Va.), "The Magnesium Symposium", Feb. 9, 1951, p. 11-19.

Design as applied to Mg and its alloys. Suitability of the various alloys for different uses. (T general, G5, Mg)

464-T. Aluminum Vs. Copper in Your Electrical System. Joe St. Andre. *Factory Management and Maintenance,* v. 110, Sept. 1952, p. 132-134.

Information condensed in chart form. (T1, Al, Cu)

465-T. Packaging With Aluminum Foil—How, When, Where to Use It. W. J. Faymonville. *Flow,* v. 7, Sept. 1952, p. 113-120, 122, 124, 126-129.

A reference guide. Diagrams, graphs, and illustrations. (T10, Al)

466-T. Self-Baking Electrodes Spur Development of Bigger, Better Furnaces. M. O. Sem. *Iron Age,* v. 170, Aug. 28, 1952, p. 95-99.

Larger, simpler, and improved electric furnaces which have resulted in Europe from reliable operation of continuous, self-baking electrodes. Mechanically charged open smelting furnaces have been designed with swingable, charging chutes in capacities to 30,000 kw. Covered furnaces permit collection of waste gases for further use in the plant, in some cases for burning limestone. The rotating-hearth furnace has proved its worth in production operations. Savings in both coke and limestone have been reported for an 18,000-20,000-kw. unit installed in Sweden. Lower electrode consumption and cleaner operation are claimed. Diagrams and illustrations. (C21, D5)

467-T. Fabricated Castings and Plate Make Lighter Pumps. Ray Zeh. *Iron Age,* v. 170, Aug. 28, 1952, p. 100-101.

Change in petroleum slush-pump design from casting to a weldment composed of castings and steel plate. This reduced over-all weight by nearly 4000 lb. (T28, K general, CI, CN)

468-T. New Bearing Made of Any Material, Lubricated With Any Fluid. R. M. Higgins. *Iron Age,* v. 170, Sept. 11, 1952, p. 158-160.

Description of a fluid-piston type bearing developed by Allis-Chalmers Mfg. Co. Diagrams. (T7, SG-c)

469-T. Selection of Steel for Automobile Parts. A. L. Boegehold. *Metal Progress,* v. 62, Sept. 1952, p. 67-71.

The hardenability aspect. Graphs show cross-sectional hardness and strength of axles after heat treatment, compared with theoretical stress distribution; and results of torsion and fatigue tests on 11 carbon or alloy steels. Schematic relationship of end-quench hardenability test to cooling transformation diagram for SAE 8630 steel. (T21, J26, Q general, AY, CN)

470-T. New Aluminum Minesweepers for the Canadian Navy. *Modern Metals,* v. 8, Aug. 1952, p. 28-29.

Fabrication problems and the advantages in using Al for shipbuilding purposes. (T22, Al)

471-T. Light Metals in the Cummins Diesel Racing Car. *Modern Metals,* v. 8, Aug. 1952, p. 30, 32.

Some features of the car, which makes extensive use of Al and Mg. (T21, Al, Mg)

472-T. The Use of Aluminum in Insulated Power Conductors. E. E. McIlveen. *Modern Metals,* v. 8, Aug. 1952, p. 33-34, 36.

Use of Al vs. Cu from an economic and technical standpoint rather than from the availability point of view. (T1, Al, Cu)

473-T. An Almost Invisible Aluminum Storm Window. *Modern Metals,* v. 8, Aug. 1952, p. 37-38.

Al storm windows that do not have an outer subframe. (T26, Al)

474-T. Radiant Glassheat; Clean—Healthful—Economical. *Modern Metals,* v. 8, Aug. 1952, p. 54-55.

Continental Radiant Glass Heating Corp. of New York, has brought out simplified heating system which employs electrically heated glass panels. Attached to the wall, and requiring no piping or ductwork, the panels are backed by a sheet Al reflector tray that radiates the heat into the room. Heat is provided by a sprayed-on Al grid. (T27, Al)

475-T. Remodeling Buildings With Aluminum. *Modern Metals,* v. 8, Aug. 1952, p. 57-59.

Al is playing a major role in the remodeling boom now under way. A few of the many applications in this field. (T26, Al)

476-T. A Triple-Duty Office Ceiling. *Modern Metals,* v. 8, Aug. 1952, p. 60.

Perforated Al panels provide radiant heating and cooling plus acoustical control. (T26, Al)

477-T. Preparation of Zinc Sheets for the Engraver. A. G. Arend. *Process Engravers' Monthly,* v. 58, Aug. 1951, p. 234.

Casting, rolling, grinding, polishing, and inspection. (T9, C5, F23, L10, S13, Zn)

478-T. Copper Plates for Engraving. F. J. Brislee. *Process Engravers' Monthly,* v. 58, Nov. 1951, p. 329-330.

Smelting, refining, and casting. (T9, C21, C5, Cu)

479-T. Dozer Design Departs From Standard. *Steel,* v. 131, Sept. 8, 1952, p. 96, 99.

The Baker bulldozer, an all-welded construction which saves 1150 lb. of steel per unit. (T4, K1, CN)

480-T. Tramway to the Clouds. Harriet Geithmann. *Welding Engineer,* v. 37, Sept. 1952, p. 44-46.

General description of the tramway at Mt. Hood. Welded construction. (T23, K general, CN)

481-T. Wire for Pre-Stressed Concrete. B. M. Pearson. *Wire Industry,* v. 19, Aug. 1952, p. 737-738, 741-742, 761.

Requirements for materials used in the stressing, including technical advantages of prestressed concrete, metallurgical requirements of steel used, wire-rope elongation, minimum bend radius, end anchorages, relaxing in the rope heads, and use of a concrete casting. (T26, Q23, CN)

482-T. The Development of Steels for the Construction of Steam Boilers in Germany. Karl Kreitz. 4th International Mechanical Engineering Congress, June 1952, 24 pages.

General survey over the last 20 years. Tabular data on composition and mechanical properties of typical alloyed and unalloyed steels for the different periods for boiler and superheater tubes, saturated and superheated steam-collecting mains, boiler plates and drums, and for screws. 11 ref. (T26, Q general, CN, AY)

483-T. Gears for Traction Motors. C. Thielers and S. G. Klemming. 4th International Mehcanical Engineering Congress, June 1952, 9 pages.

Selection, machining, and heat treatment of steels for gears. Diagrams and graphs. (T7, G17, J general, CN, AY)

484-T. Self-Lubricating Bearings—Their Properties and Applications. K. G. Thafvelin. 4th International Mechanical Engineering Congress, June 1952, 20 pages.

Theory of bearings; experimental data on bronze bearings; friction data; permissible load; heat expansion; choice of material, oil, and shafts; assembly; and suitable applications. Photographs, graphs, and equipment and other diagrams. (T7, Q9, Cu, SG-c)

485-T. Duralumin Wire for Riveted Joints. H. Kalpers. *Draht* (Wire) (English Ed.), July 1952, p. 43.

Brief discussion. Miscellaneous properties are summarized. (T7, Al)

486-T. (French and German.) **Light-Metal Aqueduct at the Borgne Power Plant.** R. Zimmerman. *Aluminium Suisse,* v. 2, July 1952, p. 112-114.

Construction and installation in Switzerland. Advantages over reinforced concrete. (T4, Al)

487-T. (French and German.) **Aluman Roofing in Switzerland.** E. Müller. *Aluminium Suisse,* v. 2, July 1952, p. 126-131.

Excellent condition of old Al roofs. Technique and application of Al and Al-Mn alloys for roofing of all types. Photographs. (T26, R3, Al)

488-T. (French and German.) **Dining Hall for a Research Institute.** *Aluminium Suisse,* v. 2, July 1952, p. 137.

Extensive application of Al in the construction and furniture of the dining hall of the Fulmer Research Institute near London. (T26, Al)

489-T. (French and German.) **Aluminum Facades.** *Aluminium Suisse,* v. 2, July 1952, p. 138-139.

Application in buildings in Switzerland. (T26, Al)

490-T. (French.) **Applications of New Materials and Technological Processes in Typewriter and Calculator Production.** O. Maritano. 4th International Mechanical Engineering Congress, June 1952, 14 pages.

Materials used and their advantages. Problems needing solution. Materials mentioned are cast iron, light alloys, free-cutting steels, cold rolled steels, sintered iron, and plastics. Processes are die casting of cast iron and light alloys, magnetic inspection of steel bars, copper brazing, and powder metallurgy. (T10, CI, ST, Fe, Cu, SG-k)

491-T. (French.) **Modern Requirements of Alloy Steels for the Manufacture of Antifriction Bearings.** Dauide Giaccone. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Defects encountered in Cr steel for ball and roller bearings which constitute an obstacle to completion of the manufacturing processes involved. Impurities and lamination defects. Photomicrographs. (T7, M27, AY, SG-c)

492-T. (German.) **The Development of Gray Cast Iron as a Constructional Material.** E. Piwowarsky. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

Advantages, mechanical properties, constructional features, and applications. (T26, Q general, CI)

493-H. (German.) **The Particular Situation of Powder Metallurgy in the Manufacture of Permanent Magnets.** Werner Hotop. 4th International Mechanical Engineering Congress, June 1952, 25 pages.

Advantages, limitations, fields of application, and comparison with cast materials. Magnetic properties. Tables and graphs. (H general, P16, SG-n)

494-T. (German.) **Characterization of Coated Electrodes.** Werner Hummitzsch. *Schweisstechnik,* v. 6, May 1952, p. 49-57.

Evaluates different types of electrodes and their performance, in particular the craters of various coated electrodes, transfer of droplets in the electric arc, electrical resistance of electrode coatings and electrical conductivity of their hot slags, viscosity and surface tension of the slags, and form and structure of the weldments. Diagrams and photographs. (T5, K1)

495-T. Aluminium-Alloy Barges for the Congo. *Engineering,* v. 174, Aug. 29, 1952, p. 269.

Brief description. Includes dimensions and photographs. (T22, Al)

496-T. The Rolling of Metals. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 30, 1952, p. 93, 95-97.

British plant, Midland Rollmakers, Ltd., and some of the rolls manufactured. (T5, ST)

497-T. Selecting the Right Journal Bearing Material. E. H. Scott, Jr., and E. R. Booser. *Product Engineering,* v. 23, Sept. 1952, p. 119-126.

Analysis of commonly used journal bearing materials with respect to compatability, embeddability, corrosion resistance, fatigue strength, cost, and availability. 10 ref. (T7, Q general, R general, SG-c)

498-T. Designers Find New Ways to Use Aluminum. *Product Engineering,* v. 23, Sept. 1952, p. 197-201.

First all-metal, single-place, lightweight airplane (Beechcraft Associates, Inc., San Diego, Calif.); and first all-aluminum, 60-ft. ship (Grimston Astor Ltd., England). (T24, T22, Al)

499-T. Aluminium for Cables. Karl-Heinz Hahne. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Manufacture of Al cables, with emphasis on the method of applying Al sheaths. Details for the latter, especially for the Balgen sheath. Use of outer plastic coating for corrosion prevention. Diagrams, photographs, table, and graph. (T1, L26, Al)

500-T. Application of Plastics Together With Metals. Richard Vieweg. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

Application-interrelations of metals and plastics especially in regard to development and outlook for the plastics industry. Classification of plastics and comparison of properties of metals, plastics, and glasses. (T general. Q general)

501-T. Progress in the Realm of Materials for Technical Uses. R. Mossoux. 4th International Mechanical Engineering Congress, June 1952, 9 pages.

General discussion pertaining to raw materials and to ordinary construction steels. (T general, ST)

502-T. (French.) **Different Applications of Alloy Steels for Jet Engines.** Giancarlo Anselmetti. 4th International Mechanical Engineering Congress, June 1952, 9 pages.

Types of application, depending upon the temperature to which the alloys are exposed: weakly alloyed (pearlitic) mild steels for turbine disks, austenitic steels for jet engine accessories exposed to temperatures above 550° C, and special alloys, such as the "Nimonics" for turbine blades. Tables show the composition of pearlitic steels, their mechanical properties at room temperature, coefficient of expansion, and specific gravity at elevated temperatures. (T25, Q general, P10, P11, AY, Ni, SG-h)

503-T. (French.) **Prouvé School Buildings.** Maurice Victor. *Revue de l'Aluminium,* v. 29, July-Aug. 1952, p. 267-279.

Diagrams and illustrations show construction of prefabricated school buildings which make extensive use of Al alloys. They are made by the French firms Jean Prouvé and Société Studal and are extremely modernistic. (T26, Al)

504-T. (French.) **Light-Alloy Flooring of the Bascule Bridge at Havre.** Jean Reinhold. *Revue de l'Aluminium,* v. 29, July-Aug. 1952, p. 285-290.

Use of extruded Al-alloy sections with a bituminous coating as a replacement for the wood used before the war. Weight is only 44% of that of conventional flooring. (T26, Al)

505-T. (French.) **"Franklin D. Roosevelt"—a Subway Station in Aluminum.** Maurice Victor. *Revue de l'Aluminium,* v. 29, July-Aug. 1952, p. 291-294.

Use of Al-alloy decorative structure for display window framing in Paris subway station. (T26, Al)

506-T. (German.) **Light-Weight Steel Design in High-Duty Service Tower Construction.** Erich Bahke. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Design changes which become necessary when using light steels, and which led to the development of a new style in this type of construction. (T26, ST)

507-T. (German.) **Materials of Construction for Distilleries.** Dietmar Plöttner. *Werkstoffe und Korrosion,* v. 3, Aug. 1952, p. 293-294.

Relative merits of various metallic and nonmetallic materials, including protective coatings, not only for corrosion resistance but for prevention of taste changes in the liquors processed or stored. (T29, R7, L general)

508-T. (Book.) **Data Book for Civil Engineers. Vol. I. Design. Ed. 2.** Elwyn E. Seelye. 521 pages. 1951. John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $10.00.

Prime purpose is to furnish the engineer with sufficient data for designing any civil engineering work without other reference books. Included are structural data on concrete, steel and Al, and welding, and one page on metal corrosion. Present edition has been brought up to date, and expanded. (T26, T4, Q general, ST, Al)

V

MATERIALS
General Coverage of Specific Materials

152-V. New High-Temperature Alloys. A. R. Edwards. *Australasian Engineer,* June 7, 1952, p. 42-47.

Present and possible future developments in addition of Cr, Mo, and W to Fe, Ni, or Co-base alloys. Fundamental metallurgical factors involved. 29 ref. (SG-h, Fe, Ni, Co)

153-V. New High Temperature Alloy. *Materials & Methods,* v. 36, Aug. 1952, p. 98-99.

Mechanical and fabrication properties and applications of Hastelloy X, a new alloy which contains no cobalt. Nominal composition is 45 Ni, 22 Cr, 9 Mo, 0.15 C, and 24 Fe. Tables and graphs. (Ni, SG-h)

154-V. Tool Steels: Uses, Types, Treatments. T. C. DuMond. *Materials & Methods,* v. 36, Aug. 1952, p. 113-128.

Special report covers classes of toolsteels, factors in selecting proper toolsteel, and heating and heat treatment procedures. (TS)

155-V. Magnesia From Sea Water. W. C. Gilpin and N. Heasman. *Refractories Journal,* July 1952, p. 302-307.

Increasing demand and applications for Mg and its compounds, chemistry and practical procedures and equipment, the sea-water process, and refractory problems associated with this process. (C23, Mg)

156-V. Powder Metallurgy and Its Techniques Applied to the Manufacture of Materials for Extremely High Temperatures. Bernard P. Planner. *Western Machinery and Steel World,* v. 43, June 1952, p. 105, 117-118; July 1952, p. 83-85, 97; Aug. 1952, p. 93-95, 107.

See abstract of "Extremely High Temperature Materials", *Western Metals;* item 117-V, 1952. (H general, L27, SG-h)

157-V. (English.) **The Use of Boron in Special Steels.** *Aciers fins et spéciaux Francais,* June 1952, p. 34-38.

Resources, characteristics, applications, development and production of boron steels, rolling, forging, heat treatment, fabrication, microstructure, analysis, etc. (AY, B)

158-V. Titanium—the New Metal. George P. Michalos. *Bureau of Ships Journal,* v. 1, Sept. 1952, p. 7-14.

Origin, properties, uses, and potential value especially in ships and submarines. Illustrations and tables. (T22, Ti)

159-V. The Use of Austenitic Manganese Steel. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 16, 1952, p. 77-79.

Principal facts are assembled, including history, standard austenitic Mg steels, properties, addition of Ni, heat treatment, and applications. (AY)

160-V. The American Society for Testing Materials Looks at the Metal Tin. Bruce W. Gonser. *Metal Progress,* v. 62, Sept. 1952, p. 72-75.

Economic status and future prospects for tin. Resources and methods of recovery of the metal, use as a coating in the container industry, as a solder in automobile-body construction, and methods of analysis for impurities. (SN)

161-V. Substitution of Straight Chromium Stainless Steels for Chromium-Nickel Types. John Parina, Jr. *Metal Progress*, v. 62, Sept. 1952, p. 97-114.

A series of brief articles as follows: "Established Uses of Straight Chromium Stainless Steels", F. K. Bloom; "N.P.A. Regulation M-80 Lists Many Approved Uses for Chromium Stainless", G. A. Sands; "Limited Uses of Type 400 Steels Laid to Lack of Incentives", Elmer Gammeter; "Urges Wider Use of Chromium Stainless Alloys", E. C. Wright; "Many Uses Where Corrosive Conditions Are Not Severe", R. Hunter; "Substitutions Based on Knowledge of Metal and Applications Are Successful", D. W. Kaufman; "Fabricating Difficulties Being Overcome", W. F. Hodges; and "Successful Fabrication Depends on Correct Technique", C. B. Tupholme. Section on "Welding and Brazing" includes: "Three Factors Affect Weldability of Chromium-Iron Alloys", M. C. T. Bystram and W. I. Pumphrey; "Fabrication Techniques for Type 430 Stainless", M. E. Carruthers; and "Deep Drawing Techniques for Reduced Fabricating Costs", E. Von Hambach. Section headed "Aircraft Industry Takes a Cautious Attitude" covers "Aircraft Maker Collecting Data on Service Life", A. E. Leach; "Polish and Plate to Prevent Development of Rust", J. W. Sweet; and "High Corrosion Resistance of Chromized Coatings", T. P. Hoar. "420 and 431 in British Engines" covers "Use for Compressor Blades" by C. A. Dalton. Section on "Welded and Seamless Tubing—Properties and Applications" includes: "Some Rules for Using Tubular Products of 400 Series", H. D. Newell; "Type 430 Welded Tubing, Stabilized With Titanium", V. W. Whitmer and J. S. Adelson; "High-Temperature Properties of Ferritic Stainless Tubing", A. B. Wilder; and "Applications for Straight Chromium Stainless Tubing", J. A. Deitrich. Section on "Chromium-Iron Castings" includes: "Substitution of 18-8 Types With Straight Chromium Alloys for Castings", R. J. Wilcox; and "2% Ni is Good for High Chromium-Iron Alloys", Harvey T. Harrison. Section on "The Chemical Industry Can Extend Applications" covers "Chemical Industry's Experience is Reasonably Satisfactory", L. R. Honnaker; "Does Not Contaminate Mildly Corrosive Solutions", M. H. Brown; and "Gives Adequate Service in Nitric Acid and Ammonia Plants", R. A. Byorum. (T general, SS)

162-V. Aluminum Alloys of High Modulus. *Metal Progress*, v. 62, Sept. 1952, p. 142, 144. (Condensed from "Development of Aluminum Alloys Having a High Young's Modulus", G. Meikle, J. Thompson, and M. E. Whilans, *Royal Aircraft Establishment*, Technical Note Met-149, Aug. 1951.)
(Al)

163-V. The Metallurgy of Zirconium; Its Extraction, Fabrication, and Properties. A. D. Merriman. *Metal Treatment and Drop Forging*, v. 19, Aug. 1952, p. 365-371.

Methods of extraction and proper-

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ties of Zr. Present uses and future potentialities which are limited by high cost and difficulty of extraction. (To be continued.) (Zr)

164-V. Cadmium. J. Lomas. *Mine & Quarry Engineering,* v. 18, Sept. 1952, p. 291-293.

Origin, properties, and practical applications. (Cd)

165-V. Columbium—Rarest Jet Metal. Frank H. Cothay. *Mining World,* v. 14, Sept. 1952, p. 44-47.

A survey in reference to Nigerian deposits, electrostatic and air separation, concentrate specifications, strength at high temperatures, and importance in high alloys. (Cb)

166-V. The Technology of Titanium. R. I. Jaffee and J. M. Blocher, Jr. *Modern Metals,* v. 8, Aug. 1952, p. 62, 64, 66, 68. (Condensed from article in v. 4, "Resources for Freedom", report by the President's Materials Policy Commission.)

Problem of extraction; two leading economic processes (Kroll and iodide process); fabrication problem; special attributes of Ti; high-temperature Ti alloys; military applications; substitution and competitive factors. (Ti)

167-V. The Rare Earths and Their Future. Clyde Williams. *Monthly Business Review,* (Federal Reserve Bank of Cleveland), v. 34, Sept. 1952, p. 11.

The 14 metals in the "rare-earth" group of the periodic table—their separation, processing, and present and potential applications. (T general, EG-g)

168-V. (German.) **Technical Magnesium Alloys and Aluminum Alloys Containing Magnesium.** Gustav Siebel. *Zeitschrift für Metallkunde,* v. 43, July 1952, p. 238-244.

Comprehensive report on research and development work done at I. G. Farbenindustrie, A.G., Bitterfeld, Germany. 132 ref. (Mg, Al)

169-V. Boron-Treated Steels. *Iron & Steel,* v. 25, Sept. 1952, p. 412, 418.

Production of boron steels for the purpose of saving substantial quantities of Ni, Cr, and Mo. (AY)

170-V. Titanium Carbide: a New Heat-Resistant Lightweight Material. Benjamin L. Hummel. *Machine Design,* v. 24, Sept. 1952, p. 139-144.

Properties, processes, applications, and future developments. (Ti, C-n)

171-V. Copper-Clad Aluminium. *Metal Industry,* v. 81, Aug. 29, 1952, p. 163-165.

Mechanical and physical properties tabulated. Information on soldering; welding; forming; annealing; and applications, especially electrical. (T1, Al)

172-V. Beryllium Alloys in Engineering. Walter Deisinger. 4th International Mechanical Engineering Congress, June 1952, 9 pages.

Historical development; mechanical and physical properties of pure Be, and of Cu-Be, Ni-Be, and some other Be alloys; and applications. Constitution diagram for CuBe. Tables, graphs, and photographs. (Be, Cu, Ni)

173-V. The Engineering Properties and Applications of Spheroidal Graphite Cast Iron. A. B. Everest. 4th International Mechanical Congress, June 1952, 23 pages.

Summarizes latest information. Includes tables and text on mechanical and physical properties; production characteristics including machinability and weldability; modifications, including alloyed structures and surface heat treatment; hot and cold working; service properties. Illustrated. 23 ref. (CI)

174-V. (Book.) **Antimony. Ed. 3.** C. Y. Wang. 170 pages. 1952. Charles Griffin & Co., Ltd., London. 25s.

In order to confine treatment to essential phases, former chapters on history, chemistry, mineralogy, and analysis have been eliminated. Topics covered are geology of antimony, metallurgy of antimony, industrial uses, and economics. Bibliographies, tables, graphs, and diagrams. (Sb)

175-V. (Book.) **Lead in Modern Industry.** 230 pages. Lead Industries Association, 420 Lexington Ave., New York 7, N. Y. $1.50.

History of lead, production from mine to refined metal, fabrication techniques. Uses, including storage batteries, cable sheathing, chemical construction, plumbing, architecture, radiation protection, coatings, bearing metals, ammunition. Corrosion resistance and joining techniques. Manufacture, applications and properties of industrial lead compounds. (Pb)

176-V. (Book.) **Republic Enduro Stainless Steels.** 485 pages. 1951. Republic Steel Corp., Republic Bldg., Cleveland.

Development, types, properties, fabrication, heat treatment, microstructures, transformations, available forms, maintenance, applications, corrosion resistance. Numerous tables, graphs, and illustrations. (SS)

177-V. (Book.) **Symposia on Materials and Design for Light-Weight Construction: The Magnesium Symposium.** *Engineer Research and Development Laboratories* (Fort Belvoir, Va.), 1951, 64 pages. $2.00. (Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

Six papers on various aspects presented Feb. 9, 1951. (Separately abstracted.) (Mg)

A COMPREHENSIVE

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GRADUATE METALLURGIST: With experience, capable of handling metallurgical activities of a division of a corporation engaged in production of commercial forgings and hand tools. Box 10-140.

REPRESENTATIVES: Several territories open for fuel and electric shop or field constructed furnaces. Write: Ferguson Equipment Corp., 21st and Penn Ave., Pittsburgh 22, Pa.

METALLOGRAPHER: For fully equipped metallographic laboratory. Metallurgy degree not necessary. Nearby universities available for additional college training. Applicant must be thoroughly familiar with metallographic techniques. Work to include both ferrous and nonferrous alloys. For application write: Educational Dept., Westinghouse Electric Corp., East Pittsburgh, Pa.

South

GENERAL FOREMAN-SHEET METAL: Require experienced man capable of managing metal fabrication department and approximately 75 men. Location, southern Virginia. Strong background in department management and complete knowledge of machine setup, sheet metal production and assembly operations. Medium size company growing fast offers real opportunity. Send resume with recent earnings in first letter. Replies confidential. Box 10-150.

West

METALLURGIST: Recent graduate or one with several years experience in joining or heat treating fields. Position with government at one of their California laboratories. Salary commensurate with education and experience. Box 10-40.

METALLURGIST: With M.S. or Ph.D. degree, or engineer with interest and preferably with experience in X-ray diffraction investigations for application of preferred orientation studies to metallurgical processes. Write: Head, X-Ray Laboratory, Division of Metallurgical Research, Kaiser Aluminum & Chemical Corp., P.O. Box 1451, Spokane 10, Wash.

COLUMBIA UNIVERSITY
School of Mines
Henry Krumb Scholarships
William Campbell Fellowships

Applications are invited for the Krumb Scholarships and Campbell Fellowships for the academic year 1953-54. These are available to candidates for degrees in the fields of mining, mineral and metallurgical engineering.

The Krumb Scholarships, with yearly stipends of $1000 and transportation to New York City, are in support of studies towards the B.S., M.S. or professional engineering degrees. Preference is given to students in mining engineering in the ratio of three in this field to two in metallurgical and mineral engineering.

The Campbell Fellowships, established to encourage research in the general field of metals, are available to candidates for graduate and professional degrees, including the Ph.D. Five grants are usually awarded each year, with stipends of $1800 for single students and $2100 for married students.

Application blanks and further information may be obtained on request to the Office of University Admissions, Columbia University, New York 27, N. Y. Completed applications should be returned before Feb. 20, 1953.

METALLOGRAPHER

Sylvania's metallurgy laboratories located at Sylvania Center, Bayside, Long Island needs a metallographer technician. 2 years technical college highly desirable or sufficiently great experience in the field; must have 5 years experience in industrial or academic metallography laboratory. Experience should be in more than one metal. Some supervisory experience desirable. Must be capable of investigating new techniques and putting them into operation.

Send complete resume to:
MANAGER OF PERSONNEL

SYLVANIA
Electric Products, Inc.
P.O. Box 6, Bayside, L.I. N.Y.

EMPLOYMENT SERVICE BUREAU

(continued from page 52)

POSITIONS WANTED

RESEARCH METALLURGIST: Fourteen years diversified experience in applied physical and engineering metallurgy. Ph.D. degree, foreign languages. Industrial background. For several years and at present active in field of nuclear energy as applied to reactor materials. First-class references. Age 38. Desires challenging executive position with direct line responsibilities in private industry or government. Box 10-45.

METALLURGICAL ENGINEER: Ph.D. degree, 25 years experience in steel mills, copper works and industrial laboratories. Inspection, development and basic research. Familiar with microscopy, X-ray diffraction, plastic deformation, and theoretical metallurgy. Experienced in laboratory design and drafting and procurement procedures. Desires industrial position requiring analytical powers, initiative, and resourcefulness. Box 10-50.

PHYSICAL METALLURGIST: Ph. D. degree in metallurgy with minor in physics. Research experience on mechanical properties of experimental high-temperature alloys and on plasticity and fracture of metals for 3½ years. Industrial experience at production of jet engine components and experimental precision casting for 1½ years. Will relocate. Box 10-55.

METALLURGICAL ENGINEER: B.S. degree. Age 25, married, one child. To be released from Navy in December. Two years in tool and high speed steels including physical testing, metallography, failure analysis, report writing, and six months on telephone order desk. Navy experience in electronics. Special interest in position with opportunity for advanced study. Box 10-60.

METALLURGIST: B.S. in metallurgy. Age 30, married, children. Experience includes mechanical testing, both room and elevated temperatures, corrosion testing, investigation of service failures, hardenability, heat treating, some quality control on incoming materials, and report writing. Desires position in production, research and/or development. Box 10-65.

METALLURGIST: Diversified supervisory experience in mechanized foundry, manufacturing control, production, research. Presently employed as supervising metallurgist responsible for production chemical, sand, and metallurgical laboratories, raw material acceptance and procurement, manufacturing controls. Experienced duplex melter, heat treater. Desires production or metallurgical supervisory position in gray iron steel foundry. Box 10-70.

METALLURGIST: Sixteen years broad experience with carbon, alloy and stainless steels with two major steel producers and a leading research organization. Desires position as advisor to management or as chief metallurgist. Age 43, married, one child. B.S. in chemistry, graduate work in metallurgy. Professional engineer. Box 10-75.

METALLURGICAL ENGINEER: Ten years experience directing research and development departments in important European arc welding electrode manufacturers. Consulting engineer, familiar with fabrication, control problems, technical writing. Presently employed. Desires interesting position, management, technical supervision, in affiliated plant of similar progressive U. S. company. Location Europe, South America, Africa. Box 10-80.

CHEMICAL ENGINEER: Twelve years in nonferrous foundry metallurgy and ceramic development. Knowledge of plastics, business methods, economics, languages. Some teaching background. Writer, speaker, professional engineer. Married, age 35. Desires position in export or domestic sales or market research with manufacturer or agency. Box 10-85.

METALLURGIST: Age 40, married. Fifteen years as metallurgist in jobbing, production, gray iron foundries. Know melting, pouring, molding, testing, gating and risering practices for quality castings used in machine tools, farm implements, valves, dies, diesel engines, stokers, compressors, etc. Prefer west or midwest. Box 10-90.

METALS TECHNOLOGIST: Age 37, married. Academic and 14 years diversified experience. Inorganic chemical, nonferrous metallurgical, materials engineering, metals finishing background. Alloy development, heat treating, silver brazing, fluxes, corrosion studies. Processing of and electroplating from gold, palladium, rhodium baths. Chemical analysis, metallurgical testing, metallography. Southern Connecticut or Manhattan preferred. Box 10-95.

PHYSICAL METALLURGIST: Ph.D. Fourteen years in industrial development and research in ferrous metallurgy. Familiar with research methods in physical metallurgy and their application to problems. Desires position in progressive industrial or academic laboratory engaged in fundamental and applied research. Location is immaterial. Salary to be commensurate with circumstances. Box 10-100.

METALLURGIST: Administration or production. Twenty years in sales service, development and production planning, physical and chemical metallurgy. B.S. degree. Stainless, alloy, basic steel. Box 10-105.

METALLURGIST: Married, age 34, four children. B.S. degree in chemical engineering. Twelve years in metal field in process and development and production control, capable of setting up and operating sintered metal fabrication plant. Desires position in production engineering and control. Box 10-110.

METALLURGICAL ENGINEER: Six years in material and process engineering, ferrous and nonferrous heat treat supervision, failure investigations, design as related to mechanical properties and processing, metallurgical process trouble shooting, and development in light to medium industry. Cleveland-Buffalo area with industry of peace-time nature preferred. Box 10-115.

METALLURGICAL ENGINEER: Three years experience in chemical laboratory, one year research in powder metallurgy, one in development of light metals, six months sales department. Qualified for market analysis. Desires position in sales, technical sales or market analysis of light metals in U. S. Age 30, married, family. Now employed, excellent references. Box 10-155.

METALLURGISTS
FOR
RESEARCH

If you are looking for a real opportunity for professional growth and advancement in an ideal research situation, investigate the variety of attractive openings in Battelle's growing organization. Ferrous, nonferrous, physical, process, foundry, welding, ore dressing, metallography—these and related fields offer challenging opportunities to capable candidates. All applications handled quickly and confidentially. Write today directly to

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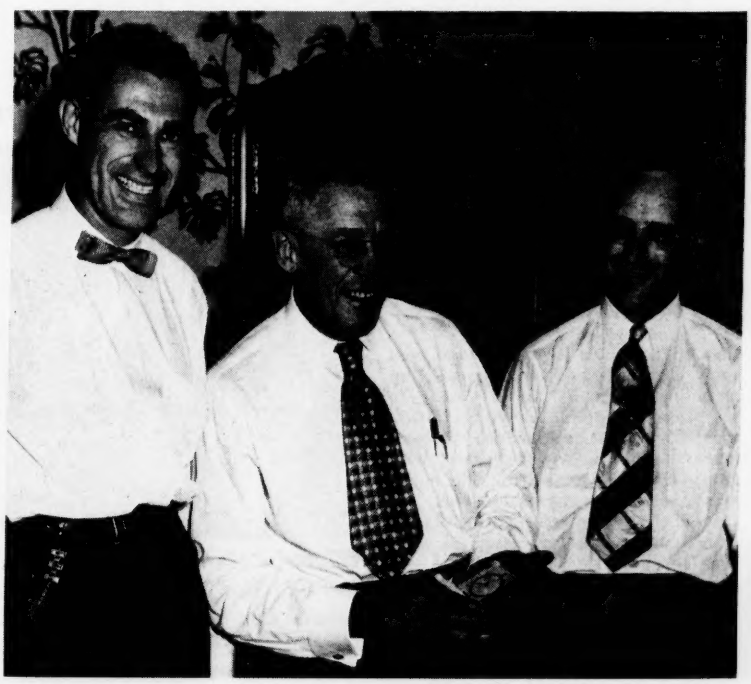

At a Small Informal Meeting the Manitoba Chapter A.S.M. Presented J. A. de Bondy (Center) With a Desk Clock Upon the Occasion of His Leaving Winnipeg. Mr. de Bondy organized the Manitoba Chapter nine years ago and was its first chairman. He is well known in the metallurgical field throughout Canada, and until recently held the position of vice-president of Manitoba Steel Foundries Ltd. Shown with Mr. de Bondy are G. E. Mason, present chapter chairman (left), and J. Johnson, immediate past chairman

EMPLOYMENT SERVICE BUREAU

(*Continued from p.* 53)

METALLURGIST: B. Met. E. (woman) with seven years metallurgical experience, one year of technical writing, typing and secretarial experience, desires work to do at home. Willing to do any metallurgical work which is compensatory. Box 10-160.

METALLURGIST: Twelve years as metallurgical adviser to engineering and manufacturing divisions of leading precision equipment manufacturer. Seeks position as chief metallurgist, laboratory supervisor or consultant with stable company, not dependent on government contracts. Box 10-165.

PLANT METALLURGIST - MATERIALS, PROCESS and CORROSION ENGINEER: Experienced in government specifications and ordnance ammunition contracts; control of metallurgical and chemical departments; heat treating, electroplating, metal finishing, cleaning, phosphating. Background with ferrous, nonferrous and nonmetallic materials, adhesives, insulating varnishes. Experienced in purchase of equipment and materials, factory supervision, design and product development of motors and appliances, including work with plastics, dielectric materials and color design. Box 10-170.

STEEL SALESMAN: Twenty years in Connecticut. Desires to represent reputable firm on straight commission basis. Will have two other noncompetitive lines. Box 10-175.

Meet Your Chapter Chairman

MANITOBA

G. E. MASON, chief engineer of the coach division of Motor Coach Industries Ltd., Winnipeg, was born in Toronto and received his elementary education there. He then moved to Winnipeg where his formal education was completed. George joined Motor

Coach Industries 11 years ago and grew with this organization, starting as a draftsman and moving along to his present position. Above the duties involved in the engineering department, he has charge of coach warranty and advertising for the entire organization. He enjoys his work and frequently makes reference to the old adage about "variety being the spice of life".

Among his hobbies, the one he enjoys the most is art, and he has accumulated a good knowledge of the subject in three years of art study. He is an ardent sportsman and is especially keen about the outdoors. He advocates year-round recreation and likes to ski, hunt, fish and swim. The sport that tops them all, according to Mr. Mason, is skiing in the Rockies.

Mr. Mason is a member of the Society of Automotive Engineers and the Association of Canadian Industrial Engineers.

MUNCIE

WALTER GRUNDEN, JR., laboratory supervisor, metallurgical department, Perfect Circle Corp., New Castle, Ind., is 34 years of age. He is married and has two daughters. He started his career in metallurgy through extension courses he took after finishing high school in the metallurgy of grey iron, spectrography and chemistry.

He started work with the Perfect Circle Corp. ten years ago, after six years with the Ingersoll Steel and Disc Division of the Borg-Warner Corp., New Castle. He has worked as laboratory technician, heat treater, supervisor of chemical section, metallographer, and finally, as laboratory supervisor.

Mr. Grunden is a photography fan, says he's a "dub" at golf, and a

"fair" bowler, and he loves to fish. He is a past secretary of the New Castle Lions Club, and is at present chairman of his community's Committee for Civic Improvement.

Ten Years Ago

Quotes From Metals Review

October 1942

Benjamin F. Shepherd, chief metallurgist of Ingersoll-Rand Co., and a past president of the American Society for Metals, will be awarded the Albert Sauveur Achievement Medal of the A. S. M. during the National Metal Congress to be held in Cleveland this year.

Worcester Educational Committee Meets

Leaders in the Educational Program Presented by Worcester Chapter During 1951-52 Were, From Left: Carl G. Bergstrom, Metallurgist, Wyman-Gordon Co., Who Lectured on "How Steel Is Tested"; Walter J. Nartowt, Assistant to Superintendent, Greenman Steel Treating Co.; Robert S. Morrow, George F. Blake, Inc., Past Chairman; Arthur L. Stowe, Plant Metallurgist, Massachusetts Steel Treating Corp., Who Spoke on "How Steel Is Heat Treated"; Walter B. Dennen, Director of Worcester Boys' Trade School; Chester J. Orciuch, Metallurgist, Wyman-Gordon Co.; Joseph C. Danec, Norton Co., Chairman of the Educational Committee; L. M. Stern, North American Mfg. Co.; L. G. Shaw, Pratt & Inman, Secretary-Treasurer; and C. M. Kay, Superintendent of Steel Work, American Steel & Wire Co., Who Spoke on "How Steel Is Made". (Reported by C. Weston Russell)

Books for the METAL INDUSTRY

Four important books published by the American Society for Metals, written by top authorities in their fields, each keyed to the problems faced by the metallurgical engineer who must meet today's critical needs in the industry.

Atom Movements—This book contains the formal papers presented at the annual Seminar, given under the auspices of the Society, and held at the two-day meeting which preceded the 32nd National Metal Congress in 1950. Twelve of the top experts discuss such aspects of diffusion as formal basis of the theory, chemical techniques, tracer techniques, mechanisms, boundary movements, high temperatures, and internal oxidation.

6 x 9 ..... red cloth $5.00

High-Temperature Properties of Metals—Five lectures by as many outstanding authorities have been bound in a volume of permanent value to metallurgical engineers. Given during the A.S.M. Educational Series held at the 32nd National Metal Congress in Chicago, the lectures cover: creep of metals, stress rupture testing, high temperature fatigue testing, methods of high temperature oxidation testing, and the experiences of an industrial metallurgical engineer in the field.

150 pages ..... 6 x 9 ..... red cloth $4.00

Interpretation of Tests and Correlation with Service—Another volume published as the result of the A.S.M. Educational Lecture Series held in Chicago during the 1950 Metal Congress. Particularly valuable in the industrial testing laboratory where product performance needs the maximum of pre-testing for resistance to fatigue, wear, stress and strain. Experts in some of the leading fabricating industries put down their conclusions based on actual application tests.

190 pages ..... 6 x 9 ..... red cloth $5.00

Metal Interfaces—This book contains the formal papers given at the annual Seminar presented under the auspices of the Society and arranged through the ASM Seminar Committee. The two-day meeting which preceded the opening of the 33rd annual National Metal Congress and Exposition in Detroit was attended by over 500 leading metallurgists and physicists of this country and from other nations all over the free world.

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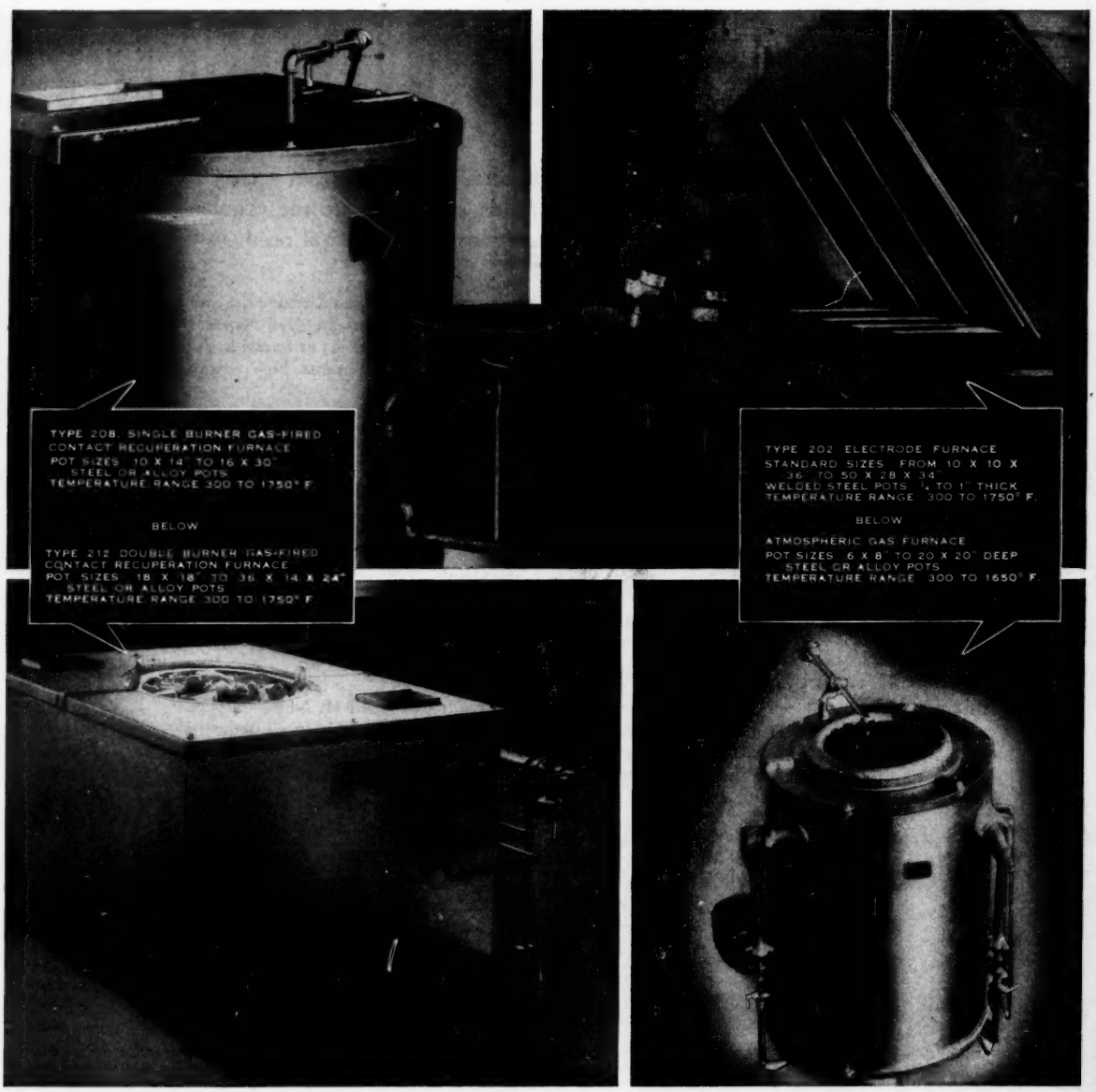
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